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ORIGINAL

Nuclear Regulatory Commission Staff Computer Programs for Use with Meteorological Data

COMPLETED
1.83

U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation

W. Snell

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NUREG-0917

Nuclear Regulatory Commission Staff Computer Programs for Use with Meteorological Data

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ABSTRACT

The Nuclear Regulatory Commission (NRC) receives hour-by-hour meteorological data on magnetic tape in a format specified in Regulatory Guide 1.70, Revision 2, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants" (September 1975). The purpose of this report was to document the computer programs that are used by the NRC meteorology staff to examine, assess and utilize these hourly values of meteorological data. A description of each of the programs is given along with the input requirements, discussion of output, subroutine flow chart, a description of each subroutine, sample output and a program listing.

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APPENDIX H Program Listing of STABQ

APPENDIX I Program Listing TDP

1.0 INTRODUCTION

Regulatory Guide 1.70, Revision 2, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants" (September 1975), recommended that, if possible, hour-by-hour meteorological data should be provided to the Nuclear Regulatory Commission (NRC) on magnetic tape. The purpose for this submission was to increase the NRC meteorology staff's ability to independently evaluate the environmental and safety related consequences of routine and accidental releases at nuclear power facilities. To avoid confusion and delays by the staff in the interpretation of meterological data submitted, a letter was sent on April 22, 1977 to all power reactor licensees and applicants with applications for a license to operate or construct a power reactor. This letter contained the details of a standardized format for submittal of hourly meteorological data on magnetic tape to the NRC. Subsequent to this letter, the NRC meteorology staff developed a number of computer programs to review and utilize the meteorological data submitted in this Standard Format. These programs are routinely used by the staff to examine and assess the quality of the data submitted as well as to convert the data to formats that are compatible as input to other NRC computer programs.

Programs DATE, MISS, PRINT, QA and STABQ are used to examine the quality and validity of the applicant's hourly meteorological data. Program JFREQ is used to calculate a joint frequency distribution of wind speed, wind direction and atmospheric stability that can be used in the NRC meteorological computer programs XOQDOQ (based on R.G. 1.111) and PAVAN (based on R.G. 1.145) for routine and accidental release meteorological analyses, respectively. These analyses, in turn, are used to assure that the radiological consequences of normal operation meet the As Low As Reasonably Achievable guidelines of 10 CFR 50, Appendix I, and that the radiological consequences of accidents conform to the provisions of 10 CFR 100, 10 CFR 51, and the Statement of Interim Policy on Nuclear Power Plant Accident Considerations Under the National Environmental Policy Act of 1969@ 45 FR 40101. Program PRECP is used to assess the quality of the applicants precipitation data prior to its use in the NRC CRAC computer code, a code which is used to assess the accident risk associated with the operation of nuclear power facilities. Program TDP is used to provide meteorological information to the hydrologic engineers to aid in their ultimate heat sink analysis.

A complete description of each of these programs is provided in this NUREG. Included with each code is a description of what it does, the input requirements to run it, a description of each subroutine, sample output and a listing of each program.

These programs were developed on an IBM 370 computer system in the FORTRAN IV language and should convert easily to other systems.

2.0 BACKGROUND

The purpose of standarizing the format for meteorological data* submitted to the NRC was to minimize the staff time necessary to utilize and interpret this data. If each applicant were to submit data in their own format, an inordinate amount of time could have been spent in trying to process the data. However, because each site had a different meteorological program, the format had to be flexible enough to handle any differences from one site to another. The result was a format that could handle almost all meteorological parameters anticipated to be recorded at a nuclear power facility. The only major drawback of the format was that it used up a large amount of space due to the many empty data fields where no information was available.

The diversity of the data available from site to site also led to additional programming considerations. In writing the programs to process the data, the intent was to keep them as simple as possible so they would be easily adaptable to other computer systems. However, a minimum amount of complexity was needed to address the differences in data available at each site and handle blank data fields. It was also necessary to have a consistent interpretation of the data between each of the programs.

2.1 Blank Data Fields

According to the criteria for the Standard Format (see Appendix A), if a specific meteorological parameter is not available for the entire data set, the appropriate field for that parameter may be left blank. To avoid confusion with computer systems that interpret a blank field as a value of zero, each program checks for blank fields. If they are found they are converted to the appropriate code for missing data.

2.2 Erroneous Data

Except for the programs DATE (which only reads the dates) and PRINT (which is used to list all the data as it is), each of the codes has a built in limit beyond which the data are considered as erroneous. These limits are consistent for all the programs and are as follows.

parameter	lower limit	upper limit	units
wind direction	0.0	365.0	degrees
wind speed	0.0	99.9	meters/second
sigma theta	0.0	365.0	degrees
temperature	-99.9	99.9	degrees C
dew point	-99.9	100.0	degrees C
delta-T	-7.0	35.0	degrees C/100 meters
precipitation	0.0	254.0	mm/hour

---

*See Appendix A for the NRC Standard Format for Meteorological Data.

3.0 DATE

3.1 Description of Program

Date reviews a data set in the NRC Standard Format for the correct sequential ordering of the data by year, Julian day and hour.

3.2 Input Cards

Card	Column	Format	Variable	Description
1	1	I1	LL	Coding of hourly data: LL=0, coded 0000-2300 LL=1, coded 0100-2400
	2	1x		Blank
	3-74	18A4	Title	Title for output

3.3 Discussion of Output

The output consists of the date of the first data record that is read, the dates and record number of any data that is found to be out-of-sequence for any reason, and the date of the last data record that is read. When an error in the data sequence is found, the two sequential records where the error occurs will be listed.

3.4 Implementation

Input Units
1 - data file of hourly meteorological data in NRC Standard Format
5 - input card 1

Output Unit
- defaults to printer

3.5 Subroutine Flow Chart

This program contains no subroutines.

3.6 Subroutine Description

This program contains no subroutines.

3.7 Sample Output

```
PROGRAM: DATE          VERSION: 1          DATED: MARCH 1982                RUN DATE:  THURSDAY          MAY 13, 1982

SITE:
             TEST  DATA
            -----------

 CONTAINS DATA FROM DECEMBER 1980 TO JANUARY 1981

 BAD DATA DATES INSERTED TO CHECK PROGRAM DATE

 HOURLY DATA CODED 0100 TO 2400



TITLE: SAMPLE RUN : INPUT FILE = DATA2  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

HOURLY DATA CODED: 01-24
```

```
PROGRAM: DATE          VERSION: 1          DATED: MARCH 1982                RUN DATE:  THURSDAY            MAY 13, 1982
SAMPLE RUN : INPUT FILE = DATA2  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)
DATE OF FIRST DATA RECORD READ:  80 365 12


BAD DATE SEQUENCE IN DATA:  80 365 15        RECORD      4
                             0   0  0        RECORD      5

BAD DATE SEQUENCE IN DATA:   0   0  0        RECORD      5
                            80 365 17        RECORD      6

BAD DATE SEQUENCE IN DATA:  80 365 20        RECORD      9
                            80 345 11        RECORD     10

BAD DATE SEQUENCE IN DATA:  80 345 11        RECORD     10
                            80 365 22        RECORD     11

BAD DATE SEQUENCE IN DATA:  80 366  1        RECORD     14
                            82 366  2        RECORD     15

BAD DATE SEQUENCE IN DATA:  82 366  2        RECORD     15
                            80 366  3        RECORD     16

BAD DATE SEQUENCE IN DATA:  80 366 11        RECORD     24
                            80 366 11        RECORD     25

BAD DATE SEQUENCE IN DATA:  80 366 11        RECORD     25
                            80 366 13        RECORD     26

BAD DATE SEQUENCE IN DATA:  81   1  1        RECORD     38
                            81   4  2        RECORD     39

BAD DATE SEQUENCE IN DATA:  81   4  2        RECORD     39
                            81   1  3        RECORD     40

BAD DATE SEQUENCE IN DATA:  81   1 19        RECORD     56
                            99 999 99        RECORD     57

BAD DATE SEQUENCE IN DATA:  99 999 99        RECORD     57
                            81   1 21        RECORD     58

BAD DATE SEQUENCE IN DATA:  81   2  3        RECORD     64
                            81   2  8        RECORD     65

BAD DATE SEQUENCE IN DATA:  81   2  8        RECORD     65
                            81   2  5        RECORD     66
```

```
PROGRAM: DATE          VERSION: 1          DATED: MARCH 1982                RUN DATE:  THURSDAY          MAY 13, 1982
SAMPLE RUN : INPUT FILE = DATA2  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)


DATE OF LAST DATA RECORD READ:  81   2 11        RECORD NO.    72
```

4.0 JFREQ

4.1 Description of Program

JFREQ derives a joint frequency distribution of wind speed, wind direction and atmospheric stability from meteorological data in the NRC Standard Format. Atmospheric stability can be determined using either a vertical temperature gradient (in degrees C per 100 meters) or sigma theta. The distribution is printed in both hours and percent along with various summarizations of the data. The option of having the hourly data punched on cards is also available.

4.2 Input Cards

Card	Column	Format	Variable	Description
1	1-72	18A4	A	Title to be printed on each page of the output.
2	1	I1	ILEV	Level of wind data to be used. ILEV=1, Upper (U). ILEV=2, Intermediate (I). ILEV=3, Lower (L).
	2	I1	IS	Delta T interval to be used. IS=1, U-L IS=2, U-I IS=3, I-L Sigma theta level to be used. IS=4, Upper IS=5, Intermediate IS=6, Lower
	3	I1	IP	Option to punch the hourly joint frequency distribution. IP=0, do not punch IP=1, punch
	4	I1	LSH	Coding of hourly data. LSH=0, 0000-2300 hours LSH=1, 0100-2400 hours
	5	I1	IPS	Print hourly stability class by hour of day. IPS=0, do not print IPS=1, print
	6-10	F5.2	CALM	Wind speed that defines calm winds (must be >0.0 and <0.5 m/s)
	11-17	F7.1	VB	Code for variable wind direction. VB=0.0 if there are no variable wind directions.

Card	Column	Format	Variable	Description
3	1-6	3I2	IY(1) IM(1) ID(1)	The year, month and day that calculations are to begin.
	7	1x		Blank.
	8-13	3I2	IY(2) IM(2) ID(2)	The year, month and day that calculations are to end.

4.3 Discussion of Output

The output is divided into three sections. The first section lists the stability class by hour of day. The second section gives the joint frequency distribution in hours and the third section gives the joint frequency distribution in percent. All percentages in the third section are based on the total number of hours shown at the end of the hourly summaries in the second section. The number of hours (or percent) of variable winds and calm winds in each stability category is included in the total number of hours (or percent) shown for that stability. In addition, the variable winds are summarized separately at the end of each of the joint frequency distributions. Punched output will contain the hourly data in the same order as the printout shows it, except for the first card which will contain the hours of calm, and the variable winds which will not be punched. The format is as follows:

Card 1-4:	Description cards
Card 5:	7I5 (calms for stability A, B, ..., G)
Card 6-75:	16I5 (hourly data for 7 stability classes with 10 wind categories per stability class)

The appropriate titles and total number of hours are punched out to aid in identification of the card output.

4.4 Implementation

If more than one joint frequency distribution is desired from the same data file, it may be obtained by inserting as many input cards 1, 2, and 3 as desired, as long as the dates specified are chronological. That is the program that will not go back and reread records from the data file that have already been read.

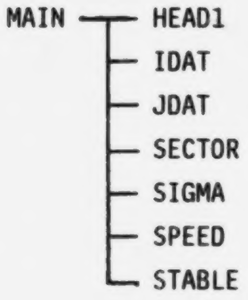
Input Units

1 - data file of hourly meteorological data
5 - input cards 1, 2, and 3

Output Unit

6 - printer

4.5 Subroutine Flow Chart



4.6 Subroutine Descriptions

Except for MAIN, all subroutines are listed alphabetically.

MAIN

The main part of the program initializes all data, reads the input cards, reads the data file, summarizes all data into the joint frequency distribution, calls all the subroutines, prints out all the results, and punches output if required.

HEAD1

This routine prints out the input parameters that were specified.

IDAT

This routine converts a given month and day to an equivalent Julian day.

JDAT

This routine converts a given Julian day to an equivalent month and day.

SECTOR

This routine distributes the wind direction data into 16 sectors centered on the principle compass points using the following equation.

$$\text{SECTOR} = 1+[(\text{DIR}+11.25)/22.5]$$

if SECTOR = 17, change to SECTOR = 1

where SECTOR = direction sector wind is blowing from
(SECTOR should be truncated to nearest whole number)
DIR = direction wind is blowing from (degrees)

Wind directions that coincide with a CALM wind speed are placed into sector 17. Wind directions that are considered variable are placed into sector 18.

SIGMA

This routine computes stability class from the horizontal deviation of wind direction (sigma theta) as follows.

Sigma theta (degrees)	Category	Stability Class
$22.5 \le \sigma\theta$	1	A
$17.5 \le \sigma\theta < 22.5$	2	B
$12.5 \le \sigma\theta < 17.5$	3	C
$7.5 \le \sigma\theta < 12.5$	4	D
$3.8 \le \sigma\theta < 7.5$	5	E
$2.1 \le \sigma\theta < 3.8$	6	F
$\sigma\theta < 2.1$	7	G

SPEED

This routine distributes the wind speed data into 10 different categories in meters per second as follows.

Wind speed (m/s)	Category
CALM	1
CALM $< U \le 0.50$	2
$0.50 < U \le 0.75$	3
$0.75 < U \le 1.00$	4
$1.00 < U \le 1.50$	5
$1.50 < U \le 2.00$	6
$2.00 < U \le 3.00$	7
$3.00 < U \le 5.00$	8
$5.00 < U \le 10.00$	9
$10.00 < U$	10

The variable CALM on input card 2 must be a wind speed greater than 0.0 and less than 0.5 m/s.

STABLE

This routine computes the stability class from atmospheric temperature gradient (delta-T) as follows.

Delta-T (°C/100m)	Category	Stability Class
$\Delta T \le -1.9$	1	A
$-1.9 < \Delta T \le -1.7$	2	B
$-1.7 < \Delta T \le -1.5$	3	C
$-1.5 < \Delta T \le -0.5$	4	D
$-0.5 < \Delta T \le 1.5$	5	E
$1.5 < \Delta T \le 4.0$	6	F
$4.0 < \Delta T$	7	G

4.7 Sample Output

```
PROGRAM: JFREQ         VERSION: 3         DATED: FEBRUARY 1982               RUN DATE:     FRIDAY             MAY  7, 1982

TITLE: SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

WIND DATA FROM LEVEL:    LOWER

DELTA-T INTERVAL:    INTERMEDIATE  MINUS   LOWER

PUNCH HOURLY JFD ON CARDS: NO

HOURLY DATA CODED:  01-24

WRITE STABILITY CLASS BY HOUR OF DAY: YES

CALM WINDS CODED:    0.27 M/S

VARIABLE WIND DIRECTION CODED:  8888.8

JFD FOR DATA PERIOD:  BEGINING -  80  12  30
                      ENDING   -  81   1   3
```

```
PROGRAM: JFREQ          VERSION: 3         DATED: FEBRUARY 1982                         RUN DATE:    FRIDAY            MAY  7, 1982
SITE:
            TEST  DATA

            ----------

 CONTAINS DATA FROM DECEMBER 1980 TO JANUARY 1891

 HOURLY DATA CODED 0100 TO 2400

********************************************************
```

```
PROGRAM: JFREQ          VERSION: 3          DATED: FEBRUARY 1982                    RUN DATE:    FRIDAY           MAY  7, 1982

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

LEVEL OF WIND DATA:    10.0 METERS              DELTA T LAYER:    60.0- 10.0 METERS

STABILITY CLASS BY HOUR OF DAY
                                              HOUR
YR MN DY     1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

80 12 30     -  -  -  -  -  -  -  -  -  -  -  E  E  E  D  D  D  D  C  C  C  C  C  C
80 12 31     B  B  C  A  A  D  D  D  E  E  E  E  E  E  D  D  D  D  -  C  -  -  C  F
81  1  1     B  B  C  F  G  D  D  A  -  E  E  E  E  E  D  D  -  -  C  C  C  C  C  C
```

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BEST DOCUMENT AVAILABLE

```
PROGRAM: JFREQ        VERSION: 3        DATED: FEBRUARY 1982              RUN DATE:    FRIDAY          MAY  7, 1982

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

LEVEL OF WIND DATA:    10.0 METERS            DELTA T LAYER:    60.0- 10.0 METERS

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS          ATMOSPHERIC STABILITY CLASS A

 U (M/S)        N    NNE     NE    ENE      E    ESE     SE    SSE      S    SSW     SW    WSW      W    WNW     NW    NNW  TOTAL
  CALM                                                                                                                            0
 CALM-.5        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
 .5-.75         0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
 .75-1.0        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
 1.0-1.5        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
 1.5-2.0        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
 2.0-3.0        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
 3.0-5.0        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
5.0-10.0        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
  >10.0         0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
VARIABLE                                                                                                                          0
           ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------
TOTAL           0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS          ATMOSPHERIC STABILITY CLASS B

 U (M/S)        N    NNE     NE    ENE      E    ESE     SE    SSE      S    SSW     SW    WSW      W    WNW     NW    NNW  TOTAL
  CALM                                                                                                                            0
 CALM-.5        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
 .5-.75         0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
 .75-1.0        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
 1.0-1.5        0      2      2      0      0      0      0      0      0      0      0      0      0      1      1      0      6
 1.5-2.0        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
 2.0-3.0        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
 3.0-5.0        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
5.0-10.0        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
  >10.0         0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
VARIABLE                                                                                                                          0
           ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------
TOTAL           0      2      2      0      0      0      0      0      0      0      0      0      0      1      1      0      6

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS          ATMOSPHERIC STABILITY CLASS C

 U (M/S)        N    NNE     NE    ENE      E    ESE     SE    SSE      S    SSW     SW    WSW      W    WNW     NW    NNW  TOTAL
  CALM                                                                                                                            0
 CALM-.5        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
 .5-.75         0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
 .75-1.0        0      2      0      0      0      0      0      0      0      0      0      0      0      0      0      1      3
 1.0-1.5        0      0      2      0      0      0      0      0      0      0      0      0      0      0      0      0      2
 1.5-2.0        0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
 2.0-3.0        0      0      0      2      0      0      0      0      0      0      0      1      0      0      0      0      3
 3.0-5.0        0      0      0      2      0      0      0      0      0      0      0      0      0      0      0      0      2
5.0-10.0        0      0      0      0      2      0      0      0      0      0      0      0      0      0      0      0      2
  >10.0         0      0      0      0      4      0      0      0      1      0      0      0      0      0      0      0      5
VARIABLE                                                                                                                          0
           ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------
TOTAL           0      2      2      4      6      0      0      0      1      0      0      1      0      0      0      1     17

CALM= 0.27 M/S
```

BEST DOCUMENT AVAILABLE

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PROGRAM: JFREQ          VERSION: 3          DATED: FEBRUARY 1982                 RUN DATE:    FRIDAY          MAY  7, 1982

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

LEVEL OF WIND DATA:    10.0 METERS             DELTA T LAYER:    60.0- 10.0 METERS

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS          ATMOSPHERIC STABILITY CLASS D

  U (M/S)          N      NNE       NE      ENE        E      ESE       SE      SSE        S      SSW       SW      WSW        W      WNW       NW      NNW    TOTAL
    CALM                                                                                                                                                          0
  CALM-.5          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
   .5-.75          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
  .75-1.0          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
  1.0-1.5          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
  1.5-2.0          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
  2.0-3.0          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
  3.0-5.0          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
 5.0-10.0          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
   >10.0           0        0        0        0        4        0        0        0        0        0        0        0        0        0        0        0        4
 VARIABLE                                                                                                                                                         0
 TOTAL      _______0 _______0 _______0 _______0 _______4 _______0 _______0 _______0 _______0 _______0 _______0 _______0 _______0 _______0 _______0 _______0 _______4

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS          ATMOSPHERIC STABILITY CLASS E

  U (M/S)          N      NNE       NE      ENE        E      ESE       SE      SSE        S      SSW       SW      WSW        W      WNW       NW      NNW    TOTAL
    CALM                                                                                                                                                          0
  CALM-.5          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
   .5-.75          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
  .75-1.0          0        0        0        0        0        0        0        1        2        0        0        0        0        0        0        0        3
  1.0-1.5          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
  1.5-2.0          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
  2.0-3.0          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
  3.0-5.0          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
 5.0-10.0          1        1        0        0        4        0        0        0        0        0        0        0        0        0        0        0        6
   >10.0           0        0        0        0        1        0        0        0        0        0        0        0        0        0        0        0        1
 VARIABLE                                                                                                                                                         2
 TOTAL      _______1 _______1 _______0 _______0 _______5 _______0 _______0 _______1 _______2 _______0 _______0 _______0 _______0 _______0 _______0 _______0 ______12

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS          ATMOSPHERIC STABILITY CLASS F

  U (M/S)          N      NNE       NE      ENE        E      ESE       SE      SSE        S      SSW       SW      WSW        W      WNW       NW      NNW    TOTAL
    CALM                                                                                                                                                          0
  CALM-.5          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
   .5-.75          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
  .75-1.0          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
  1.0-1.5          0        0        0        0        0        0        0        0        0        0        0        0        1        0        0        0        1
  1.5-2.0          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
  2.0-3.0          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
  3.0-5.0          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
 5.0-10.0          0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
   >10.0           0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0        0
 VARIABLE                                                                                                                                                         0
 TOTAL      _______0 _______0 _______0 _______0 _______0 _______0 _______0 _______0 _______0 _______0 _______0 _______0 _______1 _______0 _______0 _______0 _______1

CALM= 0.27 M/S
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PROGRAM: JFREQ          VERSION: 3         DATED: FEBRUARY 1982                  RUN DATE:    FRIDAY           MAY  7, 1982

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

LEVEL OF WIND DATA:    10.0 METERS              DELTA T LAYER:    60.0- 10.0 METERS


JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS          ATMOSPHERIC STABILITY CLASS G

 U (M/S)          N     NNE      NE     ENE       E     ESE      SE     SSE       S     SSW      SW     WSW       W     WNW      NW     NNW   TOTAL
  CALM                                                                                                                                          0
 CALM-.5          0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
 .5-.75           0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
 .75-1.0          0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
 1.0-1.5          0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
 1.5-2.0          0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
 2.0-3.0          0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
 3.0-5.0          0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
5.0-10.0          0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
  >10.0           0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
VARIABLE                                                                                                                                        0
TOTAL       _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______
                  0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS          ATMOSPHERIC STABILITY CLASS ALL

 U (M/S)          N     NNE      NE     ENE       E     ESE      SE     SSE       S     SSW      SW     WSW       W     WNW      NW     NNW   TOTAL
  CALM                                                                                                                                          0
 CALM-.5          0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
 .5-.75           0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
 .75-1.0          0       2       0       0       0       0       0       1       2       0       0       0       0       0       0       1       6
 1.0-1.5          0       2       4       0       0       0       0       0       0       0       0       0       1       1       1       0       9
 1.5-2.0          0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
 2.0-3.0          0       0       0       2       0       0       0       0       0       0       0       1       0       0       0       0       3
 3.0-5.0          0       0       0       2       0       0       0       0       0       0       0       0       0       0       0       0       2
5.0-10.0          1       1       0       0       6       0       0       0       0       0       0       0       0       0       0       0       8
  >10.0           0       0       0       0       9       0       0       0       1       0       0       0       0       0       0       0      10
VARIABLE                                                                                                                                        2
TOTAL       _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______
                  1       5       4       4      15       0       0       1       3       0       0       1       1       1       1       1      40
CALM= 0.27 M/S

TOTAL VALID HOURS =      40               TOTAL POSSIBLE HOURS =      72


OVERALL STABILITY CLASS FREQUENCIES IN HOURS

STABILITY:         A       B       C       D       E       F       G         ALL
FREQUENCY:         0       6      17       4      12       1       0          40

OVERALL WIND SPEED FREQUENCIES IN HOURS

WIND SPEED (M/S):  CALM     CALM-.5  .5-.75   .75-1.0   1.0-1.5   1.5-2.0   2.0-3.0   3.0-5.0   5.0-10.0   >10.0     VARIABLE
FREQUENCY:           0         0        0        6         9         0         3         2         8        10           2
CUMULATIVE FREQ:     0         0        0        6        15        15        18        20        28        38
```

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BEST DOCUMENT AVAILABLE

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PROGRAM: JFREQ          VERSION: 3          DATED: FEBRUARY 1982                RUN DATE:    FRIDAY            MAY  7, 1982
SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)
LEVEL OF WIND DATA:    10.0 METERS                DELTA T LAYER:    60.0- 10.0 METERS


DISTRIBUTION OF VARIABLE WINDS

  U (M/S)        A         B         C         D         E         F         G       TOTAL
   CALM          0         0         0         0         0         0         0         0
  CALM-.5        0         0         0         0         0         0         0         0
  .5-.75         0         0         0         0         0         0         0         0
  .75-1.0        0         0         0         0         0         0         0         0
  1.0-1.5        0         0         0         0         0         0         0         0
  1.5-2.0        0         0         0         0         0         0         0         0
  2.0-3.0        0         0         0         0         0         0         0         0
  3.0-5.0        0         0         0         0         0         0         0         0
 5.0-10.0        0         0         0         0         2         0         0         2
   >10.0   ______0   ______0   ______0   ______0   ______0   ______0   ______0   ______0
   TOTAL         0         0         0         0         2         0         0         2
```

19 **BEST DOCUMENT AVAILABLE**

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PROGRAM: JFREQ          VERSION: 3          DATED: FEBRUARY 1982                  RUN DATE:     FRIDAY             MAY  7, 1982

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

LEVEL OF WIND DATA:     10.0 METERS              DELTA T LAYER:     60.0- 10.0 METERS

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN FRACTIONS          ATMOSPHERIC STABILITY CLASS A

 U (M/S)         N      NNE       NE      ENE        E      ESE       SE      SSE        S      SSW       SW      WSW        W      WNW       NW      NNW    TOTAL
  CALM                                                                                                                                                     0.0
  CALM-.5      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  .5-.75       0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  .75-1.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  1.0-1.5      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  1.5-2.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  2.0-3.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  3.0-5.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
 5.0-10.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
    >10.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
 VARIABLE                                                                                                                                                  0.0
           -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------
 TOTAL         0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN FRACTIONS          ATMOSPHERIC STABILITY CLASS B

 U (M/S)         N      NNE       NE      ENE        E      ESE       SE      SSE        S      SSW       SW      WSW        W      WNW       NW      NNW    TOTAL
  CALM                                                                                                                                                     0.0
  CALM-.5      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  .5-.75       0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  .75-1.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  1.0-1.5      0.0     5.00     5.00      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0     2.50     2.50      0.0    15.00
  1.5-2.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  2.0-3.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  3.0-5.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
 5.0-10.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
    >10.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
 VARIABLE                                                                                                                                                  0.0
           -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------
 TOTAL         0.0     5.00     5.00      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0     2.50     2.50      0.0    15.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN FRACTIONS          ATMOSPHERIC STABILITY CLASS C

 U (M/S)         N      NNE       NE      ENE        E      ESE       SE      SSE        S      SSW       SW      WSW        W      WNW       NW      NNW    TOTAL
  CALM                                                                                                                                                     0.0
  CALM-.5      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  .5-.75       0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  .75-1.0      0.0     5.00      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0     2.50     7.50
  1.0-1.5      0.0      0.0     5.00      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0     5.00
  1.5-2.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  2.0-3.0      0.0      0.0      0.0     5.00      0.0      0.0      0.0      0.0      0.0      0.0      0.0     2.50      0.0      0.0      0.0      0.0     7.50
  3.0-5.0      0.0      0.0      0.0     5.00      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0     5.00
 5.0-10.0      0.0      0.0      0.0      0.0     5.00      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0     5.00
    >10.0      0.0      0.0      0.0      0.0    10.00      0.0      0.0      0.0     2.50      0.0      0.0      0.0      0.0      0.0      0.0      0.0    12.50
 VARIABLE                                                                                                                                                  0.0
           -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------
 TOTAL         0.0     5.00     5.00    10.00    15.00      0.0      0.0      0.0     2.50      0.0      0.0     2.50      0.0      0.0      0.0     2.50    42.50

CALM= 0.27 M/S
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BEST DOCUMENT AVAILABLE

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PROGRAM: JFREQ          VERSION: 3          DATED: FEBRUARY 1982                    RUN DATE:     FRIDAY            MAY  7, 1982

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

LEVEL OF WIND DATA:     10.0 METERS              DELTA T LAYER:     60.0- 10.0 METERS

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN FRACTIONS           ATMOSPHERIC STABILITY CLASS D

 U (M/S)           N      NNE      NE      ENE       E      ESE      SE      SSE       S      SSW      SW      WSW       W      WNW      NW      NNW    TOTAL
  CALM                                                                                                                                                0.0
  CALM-.5        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  .5-.75         0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  .75-1.0        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  1.0-1.5        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  1.5-2.0        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  2.0-3.0        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  3.0-5.0        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
 5.0-10.0        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
   >10.0         0.0      0.0     0.0      0.0     10.00    0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0   10.00
VARIABLE                                                                                                                                              0.0
TOTAL            0.0      0.0     0.0      0.0     10.00    0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0   10.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN FRACTIONS           ATMOSPHERIC STABILITY CLASS E

 U (M/S)           N      NNE      NE      ENE       E      ESE      SE      SSE       S      SSW      SW      WSW       W      WNW      NW      NNW    TOTAL
  CALM                                                                                                                                                0.0
  CALM-.5        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  .5-.75         0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  .75-1.0        0.0      0.0     0.0      0.0      0.0     0.0     0.0      2.50     5.00    0.0     0.0      0.0      0.0     0.0     0.0      0.0    7.50
  1.0-1.5        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  1.5-2.0        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  2.0-3.0        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  3.0-5.0        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
 5.0-10.0        2.50     2.50    0.0      0.0     10.00    0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0   15.00
   >10.0         0.0      0.0     0.0      0.0      2.50    0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    2.50
VARIABLE                                                                                                                                              5.00
TOTAL            2.50     2.50    0.0      0.0     12.50    0.0     0.0      2.50     5.00    0.0     0.0      0.0      0.0     0.0     0.0      0.0   30.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN FRACTIONS           ATMOSPHERIC STABILITY CLASS F

 U (M/S)           N      NNE      NE      ENE       E      ESE      SE      SSE       S      SSW      SW      WSW       W      WNW      NW      NNW    TOTAL
  CALM                                                                                                                                                0.0
  CALM-.5        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  .5-.75         0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  .75-1.0        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  1.0-1.5        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      2.50    0.0     0.0      0.0    2.50
  1.5-2.0        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  2.0-3.0        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
  3.0-5.0        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
 5.0-10.0        0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
   >10.0         0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0    0.0
VARIABLE                                                                                                                                              0.0
TOTAL            0.0      0.0     0.0      0.0      0.0     0.0     0.0      0.0      0.0     0.0     0.0      0.0      2.50    0.0     0.0      0.0    2.50

CALM= 0.27 M/S
```

21 BEST DOCUMENT AVAILABLE

```
PROGRAM: JFREQ          VERSION: 3          DATED: FEBRUARY 1982                  RUN DATE:     FRIDAY            MAY  7, 1982

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

LEVEL OF WIND DATA:    10.0 METERS                DELTA T LAYER:    60.0- 10.0 METERS

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN FRACTIONS        ATMOSPHERIC STABILITY CLASS G

 U (M/S)         N      NNE       NE      ENE        E      ESE       SE      SSE        S      SSW       SW      WSW        W      WNW       NW      NNW    TOTAL
  CALM                                                                                                                                                       0.0
 CALM-.5       0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
 .5-.75        0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
 .75-1.0       0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
 1.0-1.5       0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
 1.5-2.0       0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
 2.0-3.0       0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
 3.0-5.0       0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
5.0-10.0       0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
  >10.0        0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
VARIABLE                                                                                                                                                     0.0
TOTAL          0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN FRACTIONS        ATMOSPHERIC STABILITY CLASS ALL

 U (M/S)         N      NNE       NE      ENE        E      ESE       SE      SSE        S      SSW       SW      WSW        W      WNW       NW      NNW    TOTAL
  CALM                                                                                                                                                       0.0
 CALM-.5       0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
 .5-.75        0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
 .75-1.0       0.0     5.00      0.0      0.0      0.0      0.0      0.0     2.50     5.00      0.0      0.0      0.0      0.0      0.0      0.0     2.50    15.00
 1.0-1.5       0.0     5.00    10.00      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0     2.50     2.50     2.50      0.0    22.50
 1.5-2.0       0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
 2.0-3.0       0.0      0.0      0.0     5.00      0.0      0.0      0.0      0.0      0.0      0.0      0.0     2.50      0.0      0.0      0.0      0.0     7.50
 3.0-5.0       0.0      0.0      0.0     5.00      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0     5.00
5.0-10.0      2.50     2.50      0.0      0.0    15.00      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0    20.00
  >10.0        0.0      0.0      0.0      0.0    22.50      0.0      0.0      0.0     2.50      0.0      0.0      0.0      0.0      0.0      0.0      0.0    25.00
VARIABLE                                                                                                                                                    5.00
TOTAL         2.50    12.50    10.00    10.00    37.50      0.0      0.0     2.50     7.50      0.0      0.0     2.50     2.50     2.50     2.50     2.50   100.00

CALM= 0.27 M/S

PERCENT DATA RECOVERY =  55.6


OVERALL STABILITY CLASS FREQUENCIES IN PERCENT

STABILITY:           A         B         C         D         E        F         G          ALL
FREQUENCY:         0.0      15.0      42.5      10.0      30.0      2.5       0.0        100.0

OVERALL WIND SPEED FREQUENCIES IN PERCENT

WIND SPEED (M/S):  CALM      CALM-.5  .5-.75    .75-1.0    1.0-1.5    1.5-2.0    2.0-3.0    3.0-5.0    5.0-10.0    >10.0      VARIABLE
FREQUENCY:          0.0        0.0      0.0      15.0       22.5        0.0        7.5        5.0       20.0       25.0          5.0
CUMULATIVE FREQ:    0.0        0.0      0.0      15.0       37.5       37.5       45.0       50.0       70.0       95.0
```

```
PROGRAM: JFREQ          VERSION: 3          DATED: FEBRUARY 1982                    RUN DATE:    FRIDAY          MAY  7, 1982

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

LEVEL OF WIND DATA:    10.0 METERS              DELTA T LAYER:    60.0- 10.0 METERS



DISTRIBUTION OF VARIABLE WINDS

  U (M/S)        A         B         C         D         E         F         G       TOTAL
   CALM         0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  CALM-.5       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  .5-.75        0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  .75-1.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  1.0-1.5       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  1.5-2.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  2.0-3.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  3.0-5.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
 5.0-10.0       0.0       0.0       0.0       0.0       5.00      0.0       0.0       5.00
   >10.0        0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
 ---------    ------    ------    ------    ------    ------    ------    ------    ------
   TOTAL        0.0       0.0       0.0       0.0       5.00      0.0       0.0       5.00
```

5.0 MISS

5.1 Description of Program

This program summarizes the periods of occurrence of missing hourly values of wind direction, wind speed, temperature, dew point, delta-T and precipitation for data in the NRC Standard Format.

5.2 Input Cards

Card	Column	Format	Variable	Description
1	1-72	18A4	TITLE	Title that will be printed at top of output.
2	1-6	3I2	JY, JM, JD	Starting year, month and day.
	7	1X		Blank.
	8-13	3I2	KY, KM, KD	Ending year, month and day.

5.3 Discussion of Output

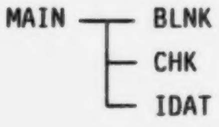
The program MISS summarizes the lengths of the missing periods, the number of occurrences of missing data, the total number of hours of missing data, the longest period of missing data, the total number of hours checked and the percent data recovery.

5.4 Implementation

Input Units
- 1 - data file of hourly metoerological data in the NRC Standard Format
- 5 - input cards 1 and 2

Output Units
- - defaults to printer

5.5 Subroutine Flow Chart



5.6 Subroutine Descriptions

Except for MAIN, all subroutines are listed alphabetically.

MAIN

The main part of the program, reads in the data, makes all summaries and prints out the results.

BLNK

Checks for and converts blank data fields to 9999.9.

CHK

This routine categorizes the occurrence intervals of the missing data into periods of 1,2,3,4,5,6,7-11, 12-23, 24-47, 48-71, 72-95, 96-119 and greater then 119 hours.

IDAT

This routine converts a given month and day to an equivalent Julian day.

5.7 Sample Output

```
PROGRAM: MISS          VERSION: 2          DATED: FEBRUARY 1982                     RUN DATE:    FRIDAY           MAY 14, 1982

SITE:

             TEST  DATA

             ----------

 CONTAINS DATA FROM DECEMBER 1980 TO JANUARY 1891

 HOURLY DATA CODED 0100 TO 2400

*******************************************************




INPUT OPTIONS:

TITLE:  SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

STARTING DATE: 80 12 30
ENDING DATE:   81  1  2
```

```
PROGRAM: MISS          VERSION: 2          DATED: FEBRUARY 1982                    RUN DATE:     FRIDAY            MAY 14, 1982

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

HOURLY SUMMARY OF MISSING DATA

                             110.0 METERS                          60.0 METERS                          10.0 METERS                 TEMPERATURE DIFFERENCE
                   -------------------------------------  -------------------------------------  -------------------------------------  -----------------------------
  PERIOD OF         WIND     WIND                 DEW      WIND     WIND                 DEW      WIND     WIND                 DEW      (DEGREES C/100METERS)
  OCCURENCE          DIR    SPEED     TEMP      POINT       DIR    SPEED     TEMP      POINT       DIR    SPEED     TEMP      POINT     110.0-  110.0-   60.0-      PRECIP
  (HOURS)          (DEG)    (M/S)      (C)        (C)     (DEG)    (M/S)      (C)        (C)     (DEG)    (M/S)      (C)        (C)      10.0    60.0    10.0        (MM)
  -------          -----    -----    -----      -----     -----    -----    -----      -----     -----    -----    -----      -----     -----   -----   -----       -----

     1                 1        3        3          0         2        4        0          0         1        7        0          3         9       2       2           8
     2                 1        0        0          0         1        0        3          0         0        3        0          0         0       2       2           0
     3                 1        0        0          0         0        0        0          0         2        1        0          0         0       0       0           0
     4                 0        0        0          0         0        0        0          0         0        0        0          0         0       0       0           0
     5                 0        0        0          0         0        0        0          0         1        0        0          0         0       0       0           0
     6                 0        0        0          0         0        0        0          0         0        1        0          0         0       0       0           0
   7-11                0        0        0          0         0        0        0          0         0        0        0          0         0       0       0           0
   12-23               0        0        0          0         0        0        0          0         0        0        0          0         0       0       0           0
   24-47               0        0        0          0         0        0        0          0         0        0        0          0         0       0       0           0
   43-71               0        0        0          0         0        0        0          0         0        0        0          0         0       0       0           0
   72-95               0        0        0          0         0        0        0          1         0        0        0          0         0       0       0           0
   96-119              0        0        0          0         0        0        0          0         0        0        0          0         0       0       0           0
     >120              0        0        0          0         0        0        0          0         0        0        0          0         0       0       0           0
LONGEST CASE           3        1        1          0         2        1        2         72         5        6        0          1         1       2       2           1
TOTAL HOURS
  MISSING              6        3        3          0         4        4        6         72        12       22        0          3         9       6       6           8
TOTAL HOURS           72       72       72         72        72       72       72         72        72       72       72         72        72      72      72          72
PERCENT DATA
  RECOVERY          91.7     95.8     95.8      100.0      94.4     94.4     91.7        0.0      83.3     69.4    100.0       95.8      87.5    91.7    91.7        88.9
```

BEST DOCUMENT AVAILABLE

6.0 PRECP

6.1 Description of Program

This program will summarize precipitation data by occurrence, intensity, stability class and month and day.

6.2 Input Cards

Card	Column	Format	Variable	Description
1	1-72	18A4	TITLE	Title to be printed on output.
2	1	I1	IS	Delta-T interval for stability determination. IS=1: upper-lower IS=2: upper-intermediate IS=3: intermediate-lower
	2	1x		Blank
	3-8	3I2	LY1, LM1, LD1	Starting year, month and day
	9	1x		Blank
	10-15	3I2	LY2, LM2, LD2	Ending year, month and day

6.3 Discussion of Output

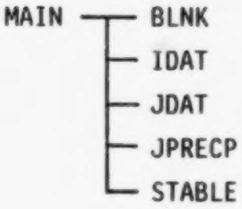
Three tables are printed out which summarize precipitation amounts by month and day, precipitation occurrences by intensity and month, and precipitation occurrences by stability and intensity. Also given is the percent data recovery for precipitation.

6.4 Implementation

Input Units
- 1 - data file of hourly meteorlogical data in the NRC Standard Format
- 5 - input cards 1 and 2

Output Units
- - defaults to printer

6.5 Subroutine Flow Chart



6.6 Subroutine Descriptions

Except for MAIN, all subroutines are listed alphabetically.

MAIN

The main part of the program reads in the data, makes all summaries and prints out the results.

BLNK

Checks for and converts blank data fields to 9999.9.

IDAT

This routine converts a given month and day to an equivalenet Julian day.

JDAT

This routine converts a given Julian day to an equivalent month and day.

JPRECP

This routine categorizes hourly precipitation by intensity.

STABLE

This routine computes the stability class from atmospheric temperature gradient (delta-T) as follows.

Delta-T (°C/100m)	Category	Stability Class
$\Delta T \le -1.9$	1	A
$-1.9 < \Delta T \le -1.7$	2	B
$-1.7 < \Delta T \le -1.5$	3	C
$-1.5 < \Delta T \le -0.5$	4	D
$-0.5 < \Delta T \le 1.5$	5	E
$1.5 < \Delta T \le 4.0$	6	F
$4.0 < \Delta T$	7	G

6.7 Sample Output

```
PROGRAM: PRECP          VERSION: 2          DATED: FEBRUARY 1982                    RUN DATE:    FRIDAY            MAY 21, 1982
SITE:
            TEST  DATA

             ----------

 CONTAINS DATA FROM DECEMBER 1980 TO JANUARY 1891

 HOURLY DATA CODED 0100 TO 2400

*******************************************************




TITLE: SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

START DATE:  80 12 30
END   DATE:  81  1  2






HOURS VALID PRECIPITATION:    64
TOTAL HOURS EXAMINED:         72
PERCENT DATA RECOVERY:      88.9
```

```
PROGRAM: PRECP          VERSION: 2          DATED: FEBRUARY 1982                RUN DATE:    FRIDAY            MAY 21, 1982
SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

                              PRECIPITATION SUMMARIZED BY MONTH AND DAY IN MILLIMETERS
                                                      MONTH
  DAY       JAN       FEB       MAR       APR       MAY       JUN       JUL       AUG       SEP       OCT       NOV       DEC

    1      46.2       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    2       1.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    3       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    4       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    5       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    6       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    7       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    8       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    9       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   10       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   11       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   12       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   13       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   14       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   15       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   16       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   17       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   18       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   19       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   20       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   21       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   22       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   23       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   24       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   25       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   26       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   27       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   28       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   29       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   30       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       2.8
   31       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0     162.0

TOTAL      47.2       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0     164.8    TOTAL=    212.0 MM
```

```
PROGRAM: PRECP          VERSION: 2          DATED: FEBRUARY 1982                    RUN DATE:     FRIDAY            MAY 21, 1982
SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

                               PRECIPITATION OCCURRENCES SUMMARIZED BY MONTH AND INTENSITY IN HOURS
                                                              MONTH
INTENSITY        JAN       FEB       MAR       APR       MAY       JUN       JUL       AUG       SEP       OCT       NOV       DEC
  (MM)

      0.0         24         0         0         0         0         0         0         0         0         0         0        25
 >0.0-.25          0         0         0         0         0         0         0         0         0         0         0         3
 >.25-.50          0         0         0         0         0         0         0         0         0         0         0         2
 >.50-.75          0         0         0         0         0         0         0         0         0         0         0         1
 >.75-1.0          1         0         0         0         0         0         0         0         0         0         0         1
 >1.0-2.0          2         0         0         0         0         0         0         0         0         0         0         0
 >2.0-3.0          0         0         0         0         0         0         0         0         0         0         0         0
 >3.0-4.0          0         0         0         0         0         0         0         0         0         0         0         0
 >4.0-5.0          0         0         0         0         0         0         0         0         0         0         0         0
 >5.0-7.5          0         0         0         0         0         0         0         0         0         0         0         0
 >7.5-10.          0         0         0         0         0         0         0         0         0         0         0         0
 >10.-15.          1         0         0         0         0         0         0         0         0         0         0         1
 >15.-20.          0         0         0         0         0         0         0         0         0         0         0         0
 >20.-25.          0         0         0         0         0         0         0         0         0         0         0         0
 >25.-30.          0         0         0         0         0         0         0         0         0         0         0         0
 >30.-40.          1         0         0         0         0         0         0         0         0         0         0         0
 >40.              0         0         0         0         0         0         0         0         0         0         0         2

TOTAL HRS         29         0         0         0         0         0         0         0         0         0         0        35

 PERCENT        45.3       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0      54.7
```

```
PROGRAM: PRECP         VERSION: 2         DATED: FEBRUARY 1982               RUN DATE:    FRIDAY          MAY 21, 1982
SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)
DELTA-T INTERVAL:    60.0-   10.0 METERS

                 PRECIPITATION OCCURRENCES SUMMARIZED BY STABILITY AND INTENSITY IN HOURS

                                           STABILITY CLASS                                                  CUMULATIVE
INTENSITY        A        B        C        D        E        F        G      MISS     TOTAL     PERCENT      PERCENT
  (MM)

      0.0        4        6       17       10        3        2        2        5       49      76.56        76.6
 >0.0-.25        0        0        0        0        3        0        0        0        3       4.69        81.3
 >.25-.50        0        0        0        2        0        0        0        0        2       3.13        84.4
 >.50-.75        0        0        0        1        0        0        0        0        1       1.56        85.9
 >.75-1.0        1        0        0        1        0        0        0        0        2       3.13        89.1
 >1.0-2.0        0        0        0        0        2        0        0        0        2       3.13        92.2
 >2.0-3.0        0        0        0        0        0        0        0        0        0       0.0         92.2
 >3.0-4.0        0        0        0        0        0        0        0        0        0       0.0         92.2
 >4.0-5.0        0        0        0        0        0        0        0        0        0       0.0         92.2
 >5.0-7.5        0        0        0        0        0        0        0        0        0       0.0         92.2
 >7.5-10.        0        0        0        0        0        0        0        0        0       0.0         92.2
 >10.-15.        0        0        0        0        2        0        0        0        2       3.13        95.3
 >15.-20.        0        0        0        0        0        0        0        0        0       0.0         95.3
 >20.-25.        0        0        0        0        0        0        0        0        0       0.0         95.3
 >25.-30.        0        0        0        0        0        0        0        0        0       0.0         95.3
 >30.-40.        0        0        0        0        1        0        0        0        1       1.56        96.9
 >40.            0        0        0        0        2        0        0        0        2       3.13       100.0

HRS WITH
 PRECIP          1        0        0        4       10        0        0        0       15      23.44

 PERCENT      6.67      0.0      0.0    26.67    66.67      0.0      0.0      0.0


TOTAL HRS        5        6       17       14       13        2        2        5       64

 PERCENT       7.8      9.4     26.6     21.9     20.3      3.1      3.1      7.8
```

7.0 PRINT

7.1 Description of Program

This program produces a listing of the following parameters from a data file in the NRC Standard Format: wind direction, wind speed, sigma theta, temperature, dew point, delta-T and precipitation.

7.2 Input Cards

Card	Column	Format	Variable	Description
1	1-72	18A4	TITLE	Title to be printed on each page.
2	1-6	I6	IS	Start date for printing data in order of year, month an day (3I2).
	7	IX		Blank.
	8-13	I6	IE	End date for printing data in order of year, month and day (3I2).

7.3 Discussion of Output

The data is printed with a title and header on each page. There are 53 data records per page printed across 132 columns with each record preceeded by the year, month, day and hour. The stability class (A, B,..., G) is also given for sigma theta and delta-T data.

Missing data are printed out as follows:

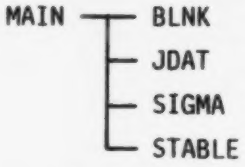
	Missing data	Blank data field
wind speed	99.9	-99.9
wind direction	999	-99
sigma theta	999.9	-99.9
temperature	999.9	-99.9
dew point	999.9	-99.9
delta-T	99.9	-99.9
precipitation	999.9	-99.9

7.4 Implementation

Input Units
- 1 - data file of hourly meteorological data in the NRC Standard Format
- 5 - input cards 1 and 2.

Output Units
- - defaults to printer

7.5 Subroutine Flow Chart



7.6 Subroutine Descriptions

Except for MAIN, all subroutines are listed alphabetically.

MAIN

The main part of the program reads in the data, calls all subroutines, and prints out the data.

BLNK

Checks for blank data fields and sets codes for missing data.

JDAT

This routine converts a given Julian day to an equivalent month and day.

SIGMA

This routine computes stability class from the horizontal deviation of wind direction (sigma theta) as follows.

Sigma theta (degrees)	Category	Stability Class
$22.5 \leq \sigma\theta$	1	A
$17.5 \leq \sigma\theta < 22.5$	2	B
$12.5 \leq \sigma\theta < 17.5$	3	C
$7.5 \leq \sigma\theta < 12.5$	4	D
$3.8 \leq \sigma\theta < 7.5$	5	E
$2.1 \leq \sigma\theta < 3.8$	6	F
$\sigma\theta < 2.1$	7	G

STABLE

This routine computes the stability class from atmospheric temperature gradient (delta-T) as follows.

Delta-T (°C/100m)	Category	Stability Class
$\Delta T \leq -1.9$	1	A
$-1.9 < \Delta T \leq -1.7$	2	B
$-1.7 < \Delta T \leq -1.5$	3	C
$-1.5 < \Delta T \leq -0.5$	4	D
$-0.5 < \Delta T \leq 1.5$	5	E
$1.5 < \Delta T \leq 4.0$	6	F
$4.0 < \Delta T$	7	G

7.7 Sample Output

```
PROGRAM: PRINT          DATED: MARCH 1982          VERSION: 2               RUN DATE:  THURSDAY           MAY 13, 1982

SITE:
             TEST  DATA

             ----------

 CONTAINS DATA FROM DECEMBER 1980 TO JANUARY 1891

 HOURLY DATA CODED 0100 TO 2400

*******************************************************



TITLE: SAMPLE RUN   -   INPUT FILE = DATA1


DATES SPECIFIED TO BE PRINTED:
     START DATE: 801230
     END   DATE: 810102
```

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BEST DOCUMENT AVAILABLE

```
PROGRAM: PRINT             DATED: MARCH 1982            VERSION: 2             RUN DATE:  THURSDAY           MAY 13, 1982

SAMPLE RUN    -   INPUT FILE = DATA1

                                                                                                            TEMPERATURE DIFFERENCE
                     110.0 METERS                              60.0 METERS                              10.0 METERS               (DEGREES C/100METERS)
              WD   WS    SIGMA  TEMP DEWPT   WD   WS    SIGMA  TEMP DEWPT   WD   WS    SIGMA  TEMP DEWPT  110.0-   110.0-    60.0-  PRECIP
YR MN DY HR (DEG)(M/S)    (DEG)   (C)   (C)(DEG)(M/S)    (DEG)   (C)   (C)(DEG)(M/S)    (DEG)   (C)   (C)    10.0     60.0     10.0    (MM)
80 12 30 12  180  1.0    5.5 E  20.0  15.0  175  1.0    7.5 D  21.0 999.9  170  1.0   10.0 D  25.0  15.0   2.0 F    1.0 E    1.0 E     0.1
80 12 30 13  200  5.0    1.0 G  21.0  17.0  180  2.0    5.0 E  21.0 999.9   90 10.0   15.0 C  25.0  12.0   1.0 E    0.5 E    0.3 E     0.2
80 12 30 14  220  7.0    5.0 E  20.0  18.0   20  5.0    5.0 E  21.0 999.9   90 20.0   20.0 B  26.0  10.0   0.2 E    0.1 E    0.1 E     0.1
80 12 30 15  220 10.0    1.0 G  20.0  15.0   15 10.0    1.0 G  24.0 999.9   90 20.0   25.0 A  27.5  12.0  -2.0 A   -1.0 D   -1.0 D     0.4
80 12 30 16  220 12.0    0.5 G  20.0  19.0   10 10.0    2.0 G  25.0 999.9   90 20.0   30.0 A  28.0  10.0  -2.5 A   -1.2 D   -1.2 D     0.5
80 12 30 17  300 18.0    1.0 G  20.0  21.0    5 12.0    1.9 G  26.0 999.9   90 20.0   35.0 A  30.0  12.0  -2.6 A   -1.3 D   -1.4 D     0.6
80 12 30 18  320 15.0    1.5 G  20.0  18.0    1  5.0    2.1 F  26.5 999.9   90 20.0    9.0 D  25.0  15.0  -2.7 A   -1.3 D   -1.4 D     0.9
80 12 30 19  330 16.0    1.6 G  20.0  19.0    0  0.5    2.2 F  25.5 999.9   90 20.0    5.0 E  24.0  24.0  -2.8 A   -1.4 D   -1.5 C     0.0
80 12 30 20  340 10.0    1.7 G  20.0  19.9   36  0.1    2.3 F  25.0 999.9   90 20.0    4.0 E  23.0  23.0  -2.9 A   -1.4 D   -1.5 C     0.0
80 12 30 21  350  9.0    1.8 G  20.0  20.0    0  0.2    2.4 F  23.0 999.9   80 10.0    3.0 F  22.0  21.0  -3.0 A   -1.5 C   -1.5 C     0.0
80 12 30 22  351  9.1    1.9 G  21.0  20.0  360  0.3    2.5 F  22.5 999.9   70  5.0    2.0 G  21.0  21.0  -3.1 A   -1.5 C   -1.6 C     0.0
80 12 30 23  352  9.2    1.0 G  22.0  20.0  359  0.4    2.6 F  22.0 999.9   60  2.5    1.0 G  20.0  19.0  -3.2 A   -1.6 C   -1.6 C     0.0
80 12 30 24  353  9.3    0.9 G  22.0  10.0  358  0.5    2.7 F  20.0 999.9   50  1.3    0.5 G  20.0  19.0  -3.3 A   -1.6 C   -1.6 C     0.0
80 12 31  1  354  9.4    0.8 G  21.0  10.0  357  0.6    2.8 F  20.0 999.9   40  1.2    0.3 G  20.0  19.0  -3.4 A   -1.7 B   -1.7 B     0.0
80 12 31  2  355  9.5    0.7 G  21.0  11.0  356  0.7    2.9 F  19.0 999.9   30  1.1    0.2 G  15.0  12.0  -3.5 A   -1.8 B   -1.7 B     0.0
80 12 31  3  356  9.6    0.6 G  20.0  13.0  355  0.8    3.0 F  18.0 999.9   20  1.0    0.1 G  14.0  14.0  -3.6 A   -2.0 A   -1.6 C     0.0
80 12 31  4  357  9.7    0.5 G 999.9  12.0  354  0.9    0.1 G  17.0 999.9   20 99.9    0.0 G  14.0  15.0  -3.7 A   -2.1 A   -1.9 A     0.0
80 12 31  5  358  9.8    0.4 G  20.0  11.0  353  1.0    3.1 F  16.0 999.9   21 99.9    0.5 G  13.0 999.9  99.9 -   -2.0 A   -2.5 A     0.0
80 12 31  6  359  9.9    0.9 G  19.0  11.0  352  1.1    3.2 F  15.0 999.9  999 10.0    1.1 G  19.0  18.0  -2.2 A   -1.1 D   -1.2 D   999.9
80 12 31  7  360 10.0    1.0 G  12.0  11.0  350  1.2    3.3 F  14.0 999.9  999  5.0    1.5 G  20.0  19.0  -1.0 D   -1.0 D   -1.0 D     0.0
80 12 31  8    1 11.0    1.1 G  13.0  12.0  350  1.4    3.4 F 999.9 999.9  999 99.9  999.9 -  20.0  19.5  -1.0 D   -0.5 D   -0.5 D     0.0
80 12 31  9    1 11.0    1.1 G  12.0  11.0  340 13.0    3.5 F 999.9 999.9   10 10.0    1.4 G  21.0  20.0  -0.4 E   -0.2 E   -0.2 E     0.0
80 12 31 10    2 12.0   10.0 D  14.0  11.0  300 16.5    3.6 F  20.0 999.9   90  9.0   18.0 B  22.0  22.0  -0.1 E   -0.1 E    0.0 E   999.9
80 12 31 11   30 13.0   12.5 C  14.5  14.0  180 21.0    3.7 F  20.5 999.9   90 99.9   19.5 B  21.0  20.0   0.0 E    0.1 E    0.1 E    12.0
80 12 31 12  180  1.0    5.5 E  20.0  15.0  175  1.0    7.5 D  21.0 999.9  170  1.0   10.0 D  25.0  15.0   2.0 F    1.0 E    1.0 E    50.0
80 12 31 13  200  5.0    1.0 G  21.0  17.0  180  2.0    5.0 E  21.0 999.9   20 10.0   15.0 C  25.0  12.0   1.0 E    0.5 E    0.3 E   100.0
80 12 31 14  999  7.0  999.9 -  20.0  18.0   20 40.0    5.0 E  21.0 999.9   90 99.9   20.0 B  26.0  10.0   0.2 E    0.1 E    0.1 E     0.0
80 12 31 15  999 10.0  999.9 -  20.0  15.0   70 10.0    1.0 G  24.0 999.9   90 99.9   25.0 A  27.5  12.0  -2.0 A   -1.0 D   -1.0 D     0.0
80 12 31 16  220 12.0  999.9 -  20.0  19.0  100 10.0    2.0 G  25.0 999.9   90 99.9   30.0 A  28.0  10.0  -2.5 A   -1.2 D   -1.2 D     0.0
80 12 31 17  999 18.0  999.9 -  20.0  21.0    5110.0    1.9 G  26.0 999.9  110 99.9   35.0 A  30.0  12.0  99.9 -   -1.3 D   -1.4 D     0.0
80 12 31 18  999 15.0  999.9 -  20.0  18.0  130  5.0    2.1 F  26.5 999.9  130 99.9    9.0 D  25.0  15.0  -2.7 A   99.9 -   -1.4 D     0.0
80 12 31 19  999 16.0  999.9 -  20.0  19.0  150  0.5    2.2 F  25.5 999.9   90 99.9    5.0 E  24.0  24.0  -2.8 A   -1.4 D   99.9 -     0.0
80 12 31 20  340 10.0    1.7 G  20.0  19.9   36  0.1    2.3 F  25.0 999.9  180 20.0    4.0 E  23.0  23.0  99.9 -   99.9 -   -1.5 C     0.0
80 12 31 21  350  9.0    1.8 G  20.0  20.0    0  0.2    2.4 F  23.0 999.9  200 10.0    3.0 F  22.0  21.0  -3.0 A   99.9 -   99.9 -     0.0
80 12 31 22  351  9.1    1.9 G  21.0  20.0  360  0.3    2.5 F  22.5 999.9  220  5.0    2.0 G  21.0  21.0  99.9 -   -1.5 C   99.9 -     0.0
80 12 31 23  352  9.2    1.0 G  22.0  20.0  359  0.4    2.6 F  22.0 999.9  250  2.5    1.0 G  20.0  19.0  -3.2 A    1.4 E   -1.6 C     0.0
80 12 31 24  353  9.3    0.9 G  22.0  10.0  358  0.5    2.7 F  20.0 999.9  260  1.3    0.5 G  20.0  19.0  -3.3 A    1.5 E    1.6 F     0.0
81  1  1  1  354  9.4    0.8 G  21.0  10.0  357  0.6    2.8 F  20.0 999.9  290  1.2    0.3 G  20.0  19.0  -3.4 A   -1.7 B   -1.7 B     0.0
81  1  1  2  355  9.5    0.7 G  21.0  11.0  999 99.9  999.9 -  19.0 999.9  310  1.1    0.2 G  15.0  12.0  -3.5 A   -1.8 B   -1.7 B     0.0
81  1  1  3  356  9.6    0.6 G  20.0  13.0  999  0.8    3.0 F  18.0 999.9   20  1.0    0.1 G  14.0  14.0  -3.6 A   -2.0 A   -1.6 C     0.0
81  1  1  4  357  9.7    0.5 G 999.9  12.0  354 99.9    0.1 G  17.0 999.9   20 99.9    0.0 G  14.0  15.0   5.0 G    4.1 G    3.9 F     0.0
81  1  1  5  358  9.8    0.4 G  20.0  11.0  353  1.0    3.1 F  16.0 999.9   21 99.9    0.5 G  13.0 999.9  99.9 -    4.8 G    7.5 G     0.0
81  1  1  6  359 99.9    0.9 G  19.0  11.0  352 99.9    3.2 F  15.0 999.9  999 99.9    1.1 G  19.0  18.0  -2.2 A   -1.1 D   -1.2 D   999.9
81  1  1  7  360 10.0    1.0 G  12.0  11.0  350  1.2    3.3 F  14.0 999.9  999  5.0    1.5 G  20.0  19.0  -1.0 D   -1.0 D   -1.0 D     0.0
81  1  1  8  999 11.0    1.1 G  13.0  12.0  999  1.4    3.4 F 999.9 999.9  999 99.9  999.9 -  20.0  19.5  -1.0 D   -0.5 D   -5.0 A     0.0
81  1  1  9    1 11.0    1.1 G  12.0  11.0  340 13.0    3.5 F 999.9 999.9   10 10.0    1.4 G  21.0  20.0  -0.4 E   -0.2 E   45.0 G     0.0
81  1  1 10    2 12.0   10.0 D  14.0  11.0  300 16.5    3.6 F  20.0 999.9   90  9.0   18.0 B  22.0  22.0  -0.1 E   -0.1 E    0.0 E   999.9
81  1  1 11   30 13.0   12.5 C  14.5  14.0  180 24.0    3.7 F  20.5 999.9   90 99.9   19.5 B  21.0  20.0   0.0 E    0.1 E    0.1 E     1.2
81  1  1 12  180  1.0    5.5 E  20.0  15.0  175  1.0    7.5 D  21.0 999.9  150  1.0   10.0 D  25.0  15.0   2.0 F    1.0 E    1.0 E     2.0
81  1  1 13  200  5.0    1.0 G  21.0  17.0  180  2.0    5.0 E  21.0 999.9   90 10.0   15.0 C  25.0  12.0   1.0 E    0.5 E    0.3 E    11.0
81  1  1 14  220  7.0    5.0 E  20.0  18.0  999  5.0    5.0 E  21.0 999.9   90 99.9   20.0 B  26.0  10.0  99.9 -    0.1 E    0.1 E    32.0
81  1  1 15  220 99.9    1.0 G  20.0  15.0   15 10.0    1.0 G  24.0 999.9   90 99.9   25.0 A  27.5  12.0  -2.0 A   99.9 -   -1.0 D     0.0
```

```
PROGRAM: PRINT            DATED: MARCH 1932          VERSION: 2                RUN DATE:  THURSDAY            MAY 13, 1982
SAMPLE RUN    -    INPUT FILE = DATA1

                              110.0 METERS                                 60.0 METERS                               10.0 METERS                 TEMPERATURE DIFFERENCE
                     ----------------------------------------  ----------------------------------------  ----------------------------------------  (DEGREES C/100METERS)
                       WD    WS      SIGMA    TEMP  DEWPT         WD    WS      SIGMA    TEMP  DEWPT       WD    WS      SIGMA    TEMP  DEWPT     ------------------------------
YR  MN  DY  HR     (DEG)(M/S)     (DEG)     (C)    (C)      (DEG)(M/S)     (DEG)     (C)    (C)     (DEG)(M/S)     (DEG)     (C)    (C)     110.0-    110.0-     60.0-    PRECIP
                                                                                                                                                 10.0      60.0      10.0     (MM)
81   1   1  16     220  12.0     0.5 G    20.0   19.0        10  10.0     2.0 G    25.0  999.9     -90  20.0    30.0 A    26.0   10.0     -2.5 A    -1.2 D    -1.2 D      0.0
81   1   1  17     300  18.0     1.0 G    20.0   21.0         5  12.0     1.9 G    26.0  999.9      90-20.0    35.0 A    30.0   12.0     99.9 -    99.9 -    99.9 -      0.0
81   1   1  18     320  15.0   -99.9 -    20.0   18.0         1   5.0     2.1 F    26.5  999.9      90  20.0    -9.0 G    25.0   15.0     -2.7 A    99.9 -    99.9 -    -99.9
81   1   1  19     330  16.0     1.6 G    20.0   19.0         0   0.5     2.2 F    25.5  999.9      90  20.0     5.0 E    24.0   24.0     -2.8 A    -1.4 D    -1.5 C      0.0
81   1   1  20     340  10.0     1.7 G    20.0   19.9        36   0.1     2.3 F    25.0  999.9      90  20.0     4.0 E    23.0   23.0     -2.9 A    -1.4 D    -1.5 C      0.0
81   1   1  21     350   9.0     1.8 G    20.0   20.0         0   0.2     2.4 F    23.0  999.9      80  10.0     3.0 F    22.0   21.0     -3.0 A    -1.5 C    -1.5 C      0.0
81   1   1  22     351-99.9     1.9 G    21.0   20.0       360   0.3     2.5 F    22.5  999.9      70   5.0     2.0 G    21.0   21.0    -99.9 -    -1.5 C    -1.6 C      0.0
81   1   1  23     352   9.2     1.0 G    22.0   20.0       359   0.4     2.6 F    22.0  999.9      60   2.5     1.0 G    20.0   19.0     -3.2 A    -1.6 C    -1.6 C      0.0
81   1   1  24     353   9.3     0.9 G    22.0   10.0       358   0.5     2.7 F    20.0  999.9      50   1.3     0.5 G    20.0   19.0     -3.3 A    -1.6 C    -1.6 C      0.0
81   1   2   1     354   9.4     0.8 G    21.0   10.0       357   0.6     2.8 F    20.0  999.9      40   1.2     0.3 G    20.0   19.0     -3.4 A    -1.7 B    -1.7 B      0.0
81   1   2   2     355   9.5     0.7 G    21.0   11.0       356   0.7     2.9 F    19.0  999.9      30   1.1     0.2 G    15.0   12.0     -3.5 A    -1.8 B    -1.7 B      0.0
81   1   2   3     356   9.6     0.6 G    20.0   13.0       355   0.8     3.0 F    18.0  999.9     328   1.0     0.1 G    14.0   14.0     -3.6 A    -2.0 A    -1.6 C      0.0
81   1   2   4     357   9.7     0.5 G   999.9   12.0       354   0.9     0.1 G    17.0  999.9      20  99.9     0.0 G    14.0   15.0     -3.7 A    -2.1 A    -1.9 A    -99.9
81   1   2   5     358   9.8     0.4 G    20.0   11.0       353   1.0     3.1 F    16.0  999.9      21  99.9     0.5 G    13.0  999.9     99.9 -    -2.0 A    -2.5 A      0.0
81   1   2   6     359   9.9     0.9 G    19.0   11.0       352   1.1     3.2 F    15.0  999.9     999  10.0     1.1 G    19.0   18.0     -2.2 A    -1.1 D    -1.2 D    999.9
81   1   2   7     360  10.0     1.0 G    12.0   11.0       350   1.2     3.3 F    14.0  999.9     999   5.0     1.5 G    20.0   19.0     -1.0 D    -1.0 D    -1.0 D      0.0
81   1   2   8       1  11.0     1.1 G    13.0   12.0       350   1.4     3.4 F   999.9  999.9     999  99.9   999.9 -    20.0   19.5     -1.0 D    -2.0 A     5.0 G      0.0
81   1   2   9       1  11.0     1.1 G    12.0   11.0       340  13.0     3.5 F   999.9  999.9    8888  10.0     1.4 G    21.0   20.0     -0.4 E    -0.2 E    -0.2 E      0.0
81   1   2  10       2  12.0    10.0 D    14.0   11.0       300  16.5     3.6 F    20.0  999.9    8888   9.0    18.0 B    22.0   22.0     -0.1 E    -0.1 E     0.0 E    999.9
81   1   2  11      30  13.0    12.5 C    14.5   14.0       180  21.0     3.7 F    20.5  999.9      90  99.9    19.5 B    21.0   20.0      0.0 E     0.1 E    -2.0 A      1.0
```

BEST DOCUMENT AVAILABLE

```
PROGRAM: PRINT          DATED: MARCH 1982          VERSION: 2               RUN DATE:  THURSDAY             MAY 13, 1982


SITE:
             TEST  DATA
             -----------

 CONTAINS DATA FROM DECEMBER 1980 TO JANUARY 1981

 BAD DATA DATES INSERTED TO CHECK PROGRAM DATE

 HOURLY DATA CODED 0100 TO 2400



TITLE: SAMPLE RUN    -   INPUT FILE = DATA2


DATES SPECIFIED TO BE PRINTED:
     START DATE:      0
     END   DATE: 999999
```

```
PROGRAM: PRINT              DATED: MARCH 1982              VERSION: 2                RUN DATE:  THURSDAY             MAY 13, 1982

SAMPLE RUN   -   INPUT FILE = DATA2

                                                                                                                            TEMPERATURE DIFFERENCE
                       110.0 METERS                         60.0 METERS                          10.0 METERS                 (DEGREES C/100METERS)
                WD    WS     SIGMA   TEMP  DEWPT     WD    WS     SIGMA   TEMP  DEWPT     WD    WS     SIGMA   TEMP  DEWPT   110.0-   110.0-    60.0-  PRECIP
YR MN DY HR (DEG) (M/S)     (DEG)    (C)    (C)  (DEG) (M/S)     (DEG)    (C)    (C)  (DEG) (M/S)     (DEG)    (C)    (C)     10.0     60.0     10.0    (MM)
80 12 30 12   180   1.0     5.5 E   20.0   15.0    175   1.0     7.5 D   21.0  999.9    170   1.0    10.0 D   25.0   15.0    2.0 F    1.0 E    1.0 E     0.1
80 12 30 13   200   5.0     1.0 G   21.0   17.0    180   2.0     5.0 E   21.0  999.9     90  10.0    15.0 C   25.0   12.0    1.0 E    0.5 E    0.3 E     0.2
80 12 30 14   220   7.0     5.0 E   20.0   18.0     20   5.0     5.0 E   21.0  999.9     90  20.0    20.0 B   26.0   10.0    0.2 E    0.1 E    0.1 E     0.1
80 12 30 15   220  10.0     1.0 G   20.0   15.0     15  10.0     1.0 G   24.0  999.9     90  20.0    25.0 A   27.5   12.0   -2.0 A   -1.0 D   -1.0 D     0.4
 0  1  0  0   220  12.0     0.5 G   20.0   19.0     10  10.0     2.0 G   25.0  999.9     90  20.0    30.0 A   28.0   10.0   -2.5 A   -1.2 D   -1.2 D     0.5
80 12 30 17   300  18.0     1.0 G   20.0   21.0      5  12.0     1.9 G   26.0  999.9     90  20.0    35.0 A   30.0   12.0   -2.6 A   -1.3 D   -1.4 D     0.6
80 12 30 18   320  15.0     1.5 G   20.0   18.0      1   5.0     2.1 F   26.5  999.9     90  20.0     9.0 D   25.0   15.0   -2.7 A   -1.3 D   -1.4 D     0.9
80 12 30 19   330  16.0     1.6 G   20.0   19.0      0   0.5     2.2 F   25.5  999.9     90  20.0     5.0 E   24.0   24.0   -2.8 A   -1.4 D   -1.5 C     0.0
80 12 30 20   340  10.0     1.7 G   20.0   19.9     36   0.1     2.3 F   25.0  999.9     90  20.0     4.0 E   23.0   23.0   -2.9 A   -1.4 D   -1.5 C     0.0
80 12 10 11   350   9.0     1.8 G   20.0   20.0      0   0.2     2.4 F   23.0  999.9     80  10.0     3.0 F   22.0   21.0   -3.0 A   -1.5 C   -1.5 C     0.0
80 12 30 22   351   9.1     1.9 G   21.0   20.0    360   0.3     2.5 F   22.5  999.9     70   5.0     2.0 G   21.0   21.0   -3.1 A   -1.5 C   -1.6 C     0.0
80 12 30 23   352   9.2     1.0 G   22.0   20.0    359   0.4     2.6 F   22.0  999.9     60   2.5     1.0 G   20.0   19.0   -3.2 A   -1.6 C   -1.6 C     0.0
80 12 30 24   353   9.3     0.9 G   22.0   10.0    358   0.5     2.7 F   20.0  999.9     50   1.3     0.5 G   20.0   19.0   -3.3 A   -1.6 C   -1.6 C     0.0
80 12 31  1   354   9.4     0.8 G   21.0   10.0    357   0.6     2.8 F   20.0  999.9     40   1.2     0.3 G   20.0   19.0   -3.4 A   -1.7 B   -1.7 B     0.0
82 12 32  2   355   9.5     0.7 G   21.0   11.0    356   0.7     2.9 F   19.0  999.9     30   1.1     0.2 G   15.0   12.0   -3.5 A   -1.8 B   -1.7 B     0.0
80 12 31  3   356   9.6     0.6 G   20.0   13.0    355   0.8     3.0 F   18.0  999.9     20   1.0     0.1 G   14.0   14.0   -3.6 A   -2.0 A   -1.6 C     0.0
80 12 31  4   357   9.7     0.5 G  999.9   12.0    354   0.9     0.1 G   17.0  999.9     20  99.9     0.0 G   14.0   15.0   -3.7 A   -2.1 A   -1.9 A     0.0
80 12 31  5   358   9.8     0.4 G   20.0   11.0    353   1.0     3.1 F   16.0  999.9     21  99.9     0.5 G   13.0  999.9   99.9 -   -2.0 A   -2.5 A     0.0
80 12 31  6   359   9.9     0.9 G   19.0   11.0    352   1.1     3.2 F   15.0  999.9    999  10.0     1.1 G   19.0   18.0   -2.2 A   -1.1 D   -1.2 D   999.9
80 12 31  7   360  10.0     1.0 G   12.0   11.0    350   1.2     3.3 F   14.0  999.9    999   5.0     1.5 G   20.0   19.0   -1.0 D   -1.0 D   -1.0 D     0.0
80 12 31  8     1  11.0     1.1 G   13.0   12.0    350   1.4     3.4 F  999.9  999.9    999  99.9   999.9 -   20.0   19.5   -1.0 D   -0.5 D   -0.5 D     0.0
80 12 31  9     1  11.0     1.1 G   12.0   11.0    340  13.0     3.5 F  999.9  999.9     10  10.0     1.4 G   21.0   20.0   -0.4 E   -0.2 E   -0.2 E     0.0
80 12 31 10     2  12.0    10.0 D   14.0   11.0    300  16.5     3.6 F   20.0  999.9     90   9.0    18.0 B   22.0   22.0   -0.1 E   -0.1 E    0.0 E   999.9
80 12 31 11    30  13.0    12.5 C   14.5   14.0    180  21.0     3.7 F   20.5  999.9     90  99.9    19.5 B   21.0   20.0    0.0 E    0.1 E    0.1 E    12.0
80 12 31 11   180   1.0     5.5 E   20.0   15.0    175   1.0     7.5 D   21.0  999.9    170   1.0    10.0 D   25.0   15.0    2.0 F    1.0 E    1.0 E    50.0
80 12 31 13   200   5.0     1.0 G   21.0   17.0    180   2.0     5.0 E   21.0  999.9     20  10.0    15.0 C   25.0   12.0    1.0 E    0.5 E    0.3 E   100.0
80 12 31 14   999   7.0   999.9 -   20.0   18.0     20  40.0     5.0 E   21.0  999.9     90  99.9    20.0 B   26.0   10.0    0.2 E    0.1 E    0.1 E     0.0
80 12 31 15   999  10.0   999.9 -   20.0   15.0     70  10.0     1.0 G   24.0  999.9     90  99.9    25.0 A   27.5   12.0   -2.0 A   -1.0 D   -1.0 D     0.0
80 12 31 16   220  12.0   999.9 -   20.0   19.0    100  10.0     2.0 G   25.0  999.9     90  99.9    30.0 A   28.0   10.0   -2.5 A   -1.2 D   -1.2 D     0.0
80 12 31 17   999  18.0   999.9 -   20.0   21.0      5110.0     1.9 G   26.0  999.9    110  99.9    35.0 A   30.0   12.0   99.9 -   -1.3 D   -1.4 D     0.0
80 12 31 18   999  15.0   999.9 -   20.0   18.0    130   5.0     2.1 F   26.5  999.9    130  99.9     9.0 D   25.0   15.0   -2.7 A   99.9 -   -1.4 D     0.0
80 12 31 19   999  16.0   999.9 -   20.0   19.0    150   0.5     2.2 F   25.5  999.9     90  99.9     5.0 E   24.0   24.0   -2.8 A   -1.4 D   99.9 -     0.0
80 12 31 20   340  10.0     1.7 G   20.0   19.9     36   0.1     2.3 F   25.0  999.9    180  20.0     4.0 E   23.0   23.0   99.9 -   99.9 -   -1.5 C     0.0
80 12 31 21   350   9.0     1.8 G   20.0   20.0      0   0.2     2.4 F   23.0  999.9    200  10.0     3.0 F   22.0   21.0   -3.0 A   99.9 -   99.9 -     0.0
80 12 31 22   351   9.1     1.9 G   21.0   20.0    360   0.3     2.5 F   22.5  999.9    220   5.0     2.0 G   21.0   21.0   99.9 -   -1.5 C   99.9 -     0.0
80 12 31 23   352   9.2     1.0 G   22.0   20.0    359   0.4     2.6 F   22.0  999.9    250   2.5     1.0 G   20.0   19.0   -3.2 A    1.4 E   -1.6 C     0.0
80 12 31 24   353   9.3     0.9 G   22.0   10.0    358   0.5     2.7 F   20.0  999.9    260   1.3     0.5 G   20.0   19.0   -3.3 A    1.5 E    1.6 F     0.0
81  1  1  1   354   9.4     0.8 G   21.0   10.0    357   0.6     2.8 F   20.0  999.9    290   1.2     0.3 G   20.0   19.0   -3.4 A   -1.7 B   -1.7 B     0.0
81  1  4  2   355   9.5     0.7 G   21.0   11.0    999  99.9   999.9 -   19.0  999.9    310   1.1     0.2 G   15.0   12.0   -3.5 A   -1.8 B   -1.7 B     0.0
81  1  1  3   356   9.6     0.6 G   20.0   13.0    999   0.8     3.0 F   18.0  999.9     20   1.0     0.1 G   14.0   14.0   -3.6 A   -2.0 A   -1.6 C     0.0
81  1  1  4   357   9.7     0.5 G  999.9   12.0    354  99.9     0.1 G   17.0  999.9     20  99.9     0.0 G   14.0   15.0    5.0 G    4.1 G    3.9 F     0.0
81  1  1  5   358   9.8     0.4 G   20.0   11.0    353   1.0     3.1 F   16.0  999.9     21  99.9     0.5 G   13.0  999.9   99.9 -    4.8 G    7.5 G     0.0
81  1  1  6   359  99.9     0.9 G   19.0   11.0    352  99.9     3.2 F   15.0  999.9    999  99.9     1.1 G   19.0   18.0   -2.2 A   -1.1 D   -1.2 D   999.9
81  1  1  7   360  10.0     1.0 G   12.0   11.0    350   1.2     3.3 F   14.0  999.9    999   5.0     1.5 G   20.0   19.0   -1.0 D   -1.0 D   -1.0 D     0.0
81  1  1  8   999  11.0     1.1 G   13.0   12.0    999   1.4     3.4 F  999.9  999.9    999  99.9   999.9 -   20.0   19.5   -1.0 D   -0.5 D   -5.0 A     0.0
81  1  1  9     1  11.0     1.1 G   12.0   11.0    340  13.0     3.5 F  999.9  999.9     10  10.0     1.4 G   21.0   20.0   -0.4 E   -0.2 E   45.0 G     0.0
81  1  1 10     2  12.0    10.0 D   14.0   11.0    300  16.5     3.6 F   20.0  999.9     90   9.0    18.0 B   22.0   22.0   -0.1 E   -0.1 E    0.0 E   999.9
81  1  1 11    30  13.0    12.5 C   14.5   14.0    180  24.0     3.7 F   20.5  999.9     90  99.9    19.5 B   21.0   20.0    0.0 E    0.1 E    0.1 E     1.2
81  1  1 12   180   1.0     5.5 E   20.0   15.0    175   1.0     7.5 D   21.0  999.9    150   1.0    10.0 D   25.0   15.0    2.0 F    1.0 E    1.0 E     2.0
81  1  1 13   200   5.0     1.0 G   21.0   17.0    180   2.0     5.0 E   21.0  999.9     90  10.0    15.0 C   25.0   12.0    1.0 E    0.5 E    0.3 E    11.0
81  1  1 14   220   7.0     5.0 E   20.0   18.0    999   5.0     5.0 E   21.0  999.9     90  99.9    20.0 B   26.0   10.0   99.9 -    0.1 E    0.1 E    32.0
81  1  1 15   220  99.9     1.0 G   20.0   15.0     15  10.0     1.0 G   24.0  999.9     90  99.9    25.0 A   27.5   12.0   -2.0 A   99.9 -   -1.0 D     0.0
```

BEST DOCUMENT AVAILABLE

```
PROGRAM: PRINT          DATED: MARCH 1982          VERSION: 2               RUN DATE:  THURSDAY           MAY 13, 1982

SAMPLE RUN   -   INPUT FILE = DATA2

                                                                                                                       TEMPERATURE DIFFERENCE
                     110.0 METERS                           60.0 METERS                         10.0 METERS           (DEGREES C/100METERS)
                  WD   WS    SIGMA   TEMP  DEWPT     WD   WS    SIGMA   TEMP DEWPT    WD   WS    SIGMA   TEMP  DEWPT    110.0-    110.0-     60.0-   PRECIP
YR  MN  DY  HR (DEG)(M/S)   (DEG)     (C)    (C) (DEG)(M/S)   (DEG)     (C)   (C) (DEG)(M/S)   (DEG)     (C)    (C)      10.0      60.0      10.0     (MM)
81   1   1  16   220 12.0     0.5 G   20.0   19.0     10 10.0     2.0 G   25.0 999.9   -90 20.0    30.0 A   23.0   10.0    -2.5 A    -1.2 D    -1.2 D      0.0
81   1   1  17   300 15.0     1.0 G   20.0   21.0      5 12.0     1.9 G   26.0 999.9    90-20.0    35.0 A   30.0   12.0    99.9 -    99.9 -    99.9 -      0.0
81   1   1  18   320 15.0   -99.9 -   20.0   18.0      1  5.0     2.1 F   26.5 999.9    90 20.0    -9.0 G   25.0   15.0    -2.7 A    99.9 -    99.9 -    -99.9
81   1   1  19   330 16.0     1.6 G   20.0   19.0      0  0.5     2.2 F   25.5 999.9    90 20.0     5.0 E   24.0   24.0    -2.8 A    -1.4 D    -1.5 C      0.0
99   12665  99   340 10.0     1.7 G   20.0   19.9     36  0.1     2.3 F   25.0 999.9    90 20.0     4.0 E   23.0   23.0    -2.9 A    -1.4 D    -1.5 C      0.0
81   1   1  21   350  9.0     1.8 G   20.0   20.0      0  0.2     2.4 F   23.0 999.9    80 10.0     3.0 F   22.0   21.0    -3.0 A    -1.5 C    -1.5 C      0.0
81   1   1  22   351-99.9     1.9 G   21.0   20.0    360  0.3     2.5 F   22.5 999.9    70  5.0     2.0 G   21.0   21.0   -99.9 -    -1.5 C    -1.6 C      0.0
81   1   1  23   352  9.2     1.0 G   22.0   20.0    359  0.4     2.6 F   22.0 999.9    60  2.5     1.0 G   20.0   19.0    -3.2 A    -1.6 C    -1.6 C      0.0
81   1   1  24   353  9.3     0.9 G   22.0   10.0    358  0.5     2.7 F   20.0 999.9    50  1.3     0.5 G   20.0   19.0    -3.3 A    -1.6 C    -1.6 C      0.0
81   1   2   1   354  9.4     0.8 G   21.0   10.0    357  0.6     2.8 F   20.0 999.9    40  1.2     0.3 G   20.0   19.0    -3.4 A    -1.7 B    -1.7 B      0.0
81   1   2   2   355  9.5     0.7 G   21.0   11.0    356  0.7     2.9 F   19.0 999.9    30  1.1     0.2 G   15.0   12.0    -3.5 A    -1.8 B    -1.7 B      0.0
81   1   2   3   356  9.6     0.6 G   20.0   13.0    355  0.8     3.0 F   18.0 999.9   328  1.0     0.1 G   14.0   14.0    -3.6 A    -2.0 A    -1.6 C      0.0
81   1   2   8   357  9.7     0.5 G  999.9   12.0    354  0.9     0.1 G   17.0 999.9    20 99.9     0.0 G   14.0   15.0    -3.7 A    -2.1 A    -1.9 A    -99.9
81   1   2   5   358  9.8     0.4 G   20.0   11.0    353  1.0     3.1 F   16.0 999.9    21 99.9     0.5 G   13.0  999.9    99.9 -    -2.0 A    -2.5 A      0.0
81   1   2   6   359  9.9     0.9 G   19.0   11.0    352  1.1     3.2 F   15.0 999.9   999 10.0     1.1 G   19.0   18.0    -2.2 A    -1.1 D    -1.2 D    999.9
81   1   2   7   360 10.0     1.0 G   12.0   11.0    350  1.2     3.3 F   14.0 999.9   999  5.0     1.5 G   20.0   19.0    -1.0 D    -1.0 D    -1.0 D      0.0
81   1   2   8     1 11.0     1.1 G   13.0   12.0    350  1.4     3.4 F  999.9 999.9   999 99.9   999.9 -   20.0   19.5    -1.0 D    -2.0 A     5.0 G      0.0
81   1   2   9     1 11.0     1.1 G   12.0   11.0    340 13.0     3.5 F  999.9 999.9  8888 10.0     1.4 G   21.0   20.0    -0.4 E    -0.2 E    -0.2 E      0.0
81   1   2  10     2 12.0    10.0 D   14.0   11.0    300 16.5     3.6 F   20.0 999.9  8888  9.0    18.0 B   22.0   22.0    -0.1 E    -0.1 E     0.0 E    999.9
81   1   2  11    30 13.0    12.5 C   14.5   14.0    130 21.0     3.7 F   20.5 999.9    90 99.9    19.5 B   21.0   20.0     0.0 E     0.1 E    -2.0 A      1.0
```

8.0 QA

8.1 Description of Program

This is a quality assurance program for checking hourly meteorological data in the NRC Standard Format. Meteorological variables that can be checked are; wind speed, wind direction, temperature, dew point, temperature gradient and precipitation. Data are read and checked one hour at a time with the date, time and a description of the problem printed out if any questionable occurrences are found.

8.2 Input Cards

Card	Column	Format	Variable	Descriptions
1	1	I1	LEV	Specifies the level(s) of data to be checked. LEV=1: upper LEV=2: upper and lower LEV=3: upper, intermediate and lower LEV=4: lower
	2	I1	IS	Specifies which delta-T intervals are to be checked. IS=0: NONE IS=1: U-L IS=2: U-I IS=3: I-L IS=4: U-L and U-I IS=5: U-L and I-L IS=6: U-I and I-L IS=7: U-L, U-I and I-L where U=upper I=intermediate and L=lower
	3	I1	IW	Check wind speed and direction IW=1: check IW=0: do not check
	4	I1	IT	Check temperature IT=1: check IT=0: do not check
	5	I1	ID	Check dew point ID=1: check ID=0: do not check IF ID=1, IT must equal 1

Card	Column	Format	Variable	Description
1	6	I1	IP	Check precipitation IP=1: check IP=0: do not check
	7	1X		Blank
	8-13	3I2	LY1, LM1, LD1	Year, month and day checking is to begin
	14	1X		Blank
	15-20	3I2	LY2, LM2, LD2	Year, month and day checking is to end
2	1-72	18A4	TITLE(18)	Title to be printed on each page of the output

8.3 Discussion of Output

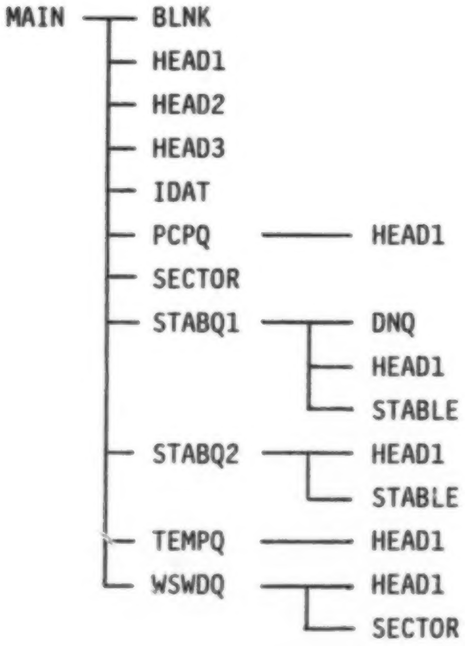
Whenever the program flags a potential error in the data, a description of the problem along with the data and time of occurrence is printed out. For errors that have persisted for an extended period of time, the last hour of that time period will be the time printed. The occurrence of valid data will cause any checking of an error over an extended time period to end. At the end of the printed output, the summaries from checking the wind speed and direction data will be printed. Also printed will be the maximum and minimum values for all levels of wind speed and direction, temeprature, dew point, delta-T and precipitation, and the number of hours they were based on. When all checking of data and printing has been completed, a statement indicating successful completion will be printed.

8.4 Implementation

Input Units
- 1 - data file of hourly meteorological data
- 5 - input cards 1 and 2

Output Units
- - defaults to printer

8.5 Subroutine Flow Chart


MAIN
BLNK
HEAD1
HEAD2
HEAD3
IDAT
PCPQ
HEAD1
SECTOR
STABQ1
DNQ
HEAD1
STABLE
STABQ2
HEAD1
STABLE
TEMPQ
HEAD1
WSWDQ
HEAD1
SECTOR

8.6 Subroutine Descriptions

Except for MAIN, all subroutines are listed alphabetically.

MAIN

The main program initializes all data, reads the input cards, prints out the input information, reads and writes the title from the data file, reads the data from the data file and calls the appropriate subroutines for checking the data.

BLNK

Checks for and converts blank data fields to 9999.9.

DNQ

This routine checks for F or G stability during the day and A, B, or C stability at night for IS=1. Day is defined as:

December	24	-	March	22	(Winter);	hours 8-17
March	23	-	June	21	(Spring);	hours 7-18
June	22	-	September	20	(Summer);	hours 6-19
September	21	-	December	23	(Fall);	hours 7-18

All other hours are defined as night.

HEAD1

This routine prints a header, page number and title at the top of each page of the output.

HEAD2

This routine prints out the input parameters that were specified.

HEAD3

This routine prints out the summarizations of the wind speed and wind direction data compiled in subroutine WSWDQ. HEAD3 is called only after the last data record has been checked.

IDAT

This routine converts a specified month and day to an equivalent Julian day.

PCPQ

This routine checks precipitation data as follows for IP=1.

- Checks for precipitation occurring greater than 8 consecutive hours.
- Checks for 1 hour of precipitation greater than or equal to 25mm (1 inch).

SECTOR

This routine distributes the wind direction data into 16 sectors centered on the principle compass points using the following equation.

$$\text{SECTOR} = 1+[(\text{DIR}+11.25)/22.5]$$

if SECTOR = 17, change to SECTOR = 1

where SECTOR = direction sector wind is blowing from
(SECTOR should be truncated to nearest whole number)
DIR = direction wind is blowing from (degrees)

Variable wind directions are treated as missing data.

STABLE

This routine computes the stability class from atmospheric temperature gradient (delta-T) as follows.

Delta-T (°C/100m)	Category	Stability Class
$\Delta T \le -1.9$	1	A
$-1.9 < \Delta T \le -1.7$	2	B
$-1.7 < \Delta T \le -1.5$	3	C
$-1.5 < \Delta T \le -0.5$	4	D
$-0.5 < \Delta T \le 1.5$	5	E
$1.5 < \Delta T \le 4.0$	6	F
$4.0 < \Delta T$	7	G

STABQ1

This routine makes the following three checks on the stability measurements for IS=1.

- Checks for the wind speed at any of the levels specified to be greater than 7.5 m/sec during unstable (A,B,C) or stable (F,G) conditions.

- Checks for delta-T less than -3.4°C/100 meters (autoconvective lapse rate).

- Checks for unstable (A,B,C) or stable (F,G) conditions during precipitation.

STABQ2

This routine makes the following stability checks for IS=1.

- Checks for a greater than 3 stability class jump for two consecutive hours.

- Checks for the same stability class for 12 or more consecutive hours.

- Checks for a greater than 2 stability class difference between two temperature gradient intervals for the same hour.

TEMPQ

This routine checks both temperature and dew point at all specified levels for IT=1. The checks that are made are as follows.

- The same temperature for 8 or more consecutive hours.

- Dew point greater than temperature if ID=1.

- Temperature minus dew point greater than 5°C during precipitation if ID=1.

- Temperature equal to dew point for 8 or more consecutive hours if ID=1.

WSWDQ

This subroutine makes the following checks on wind direction and wind speed for IW=1.

For each level:

- Checks for wind speed greater than 25 m/sec.

- Checks for wind direction from the same sector for more than 8 consecutive hours.

If more then one level is to checked:

- Totals up the cases where the wind direction is the same at any two levels.
- Totals up the cases where the wind speed is the same at any two levels.
- Totals up the cases where the wind speed is greater than 2.5, 5.0 and 7.5 m/sec at either of two levels while the wind direction between the two levels is greater than 22.5 degrees.
- Checks for the wind speed at the lower of any two levels to be greater than the wind speed at the upper of any two levels.

8.7 Sample Output

```
PROGRAM: QA         VERSION: 2         DATED: FE3RUARY 1982         RUN DATE:    FRIDAY           MAY 14, 1982         PAGE:   1
SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

CHECK FOLLOWING LEVEL(S) OF DATA:
             LOWER
             INTERMEDIATE
             UPPER

CHECK FOLLOWING DELTA-T INTERVALS:
        INTERMEDIATE  MINUS   LOWER
        UPPER         MINUS   INTERMEDIATE
        UPPER         MINUS   LOWER

CHECK WIND SPEED AND DIRECTION: YES

CHECK TEMPERATURE: YES

CHECK DEW POINT: YES

CHECK PRECIPITATION: YES

CHECK DATA:  BEGINING -  80 12 30
             ENDING   -  81  1  2

SITE:

            TEST  DATA

             ----------

 CONTAINS DATA FROM DECEMBER 1980 TO JANUARY 1891

 HOURLY DATA CODED 0100 TO 2400

*******************************************************
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```
PROGRAM: QA         VERSION: 2         DATED: FEBRUARY 1982         RUN DATE:    FRIDAY           MAY 14, 1982         PAGE:   2

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

 YR DAY HOUR
 80 365 1200    HEIGHT=  10.0M   TEMPERATURE GREATER THEN DEW POINT BY  10.0 DEGREES C DURING PRECIPITATION OF   0.1 MM
 80 365 1200    PRECIPITATION OCCURED DURING STABILITY CLASS   F  BETWEEN 110.0M AND  10.0M
 80 365 1200    STABILITY CLASS   F  DURING DAY BETWEEN 110.0M AND  10.0M
 80 365 1300    HEIGHT=  10.0M   TEMPERATURE GREATER THEN DEW POINT BY  13.0 DEGREES C DURING PRECIPITATION OF   0.2 MM
 80 365 1400    HEIGHT=  10.0M   TEMPERATURE GREATER THEN DEW POINT BY  16.0 DEGREES C DURING PRECIPITATION OF   0.1 MM
 80 365 1500    HEIGHT=  10.0M   TEMPERATURE GREATER THEN DEW POINT BY  15.5 DEGREES C DURING PRECIPITATION OF   0.4 MM
 80 365 1500    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 365 1500    PRECIPITATION OCCURED DURING STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 365 1500    STABILITY CLASS JUMPED FROM   E  TO   A OVER ONE HOUR PERIOD BETWEEN 110.0M AND  10.0M
 80 365 1500    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 80 365 1500    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 80 365 1600    HEIGHT=  10.0M   TEMPERATURE GREATER THEN DEW POINT BY  18.0 DEGREES C DURING PRECIPITATION OF   0.5 MM
 80 365 1600    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 365 1600    PRECIPITATION OCCURED DURING STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 365 1600    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 80 365 1600    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 80 365 1700    HEIGHT=  10.0M   TEMPERATURE GREATER THEN DEW POINT BY  18.0 DEGREES C DURING PRECIPITATION OF   0.6 MM
 80 365 1700    HEIGHT= 110.0M    DEW POINT (  21.0 ) IS GREATER THEN TEMPERATURE (  20.0 )
 80 365 1700    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 365 1700    PRECIPITATION OCCURED DURING STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 365 1700    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 80 365 1700    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 80 365 1800    HEIGHT=  10.0M   TEMPERATURE GREATER THEN DEW POINT BY  10.0 DEGREES C DURING PRECIPITATION OF   0.9 MM
 80 365 1800    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 365 1800    PRECIPITATION OCCURED DURING STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 365 1800    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 365 1800    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 80 365 1800    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 80 365 1900    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 365 1900    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 365 1900    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN  60.0M AND  10.0M
 80 365 1900    STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 80 365 1900    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 80 365 2000    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 365 2000    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 365 2000    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN  60.0M AND  10.0M
 80 365 2000    STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 80 365 2000    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 80 365 2100    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 365 2100    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 365 2100    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN 110.0M AND  60.0M
 80 365 2100    STABILITY CLASS   C  DURING NIGHT BETWEEN 110.0M AND  60.0M
 80 365 2100    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN  60.0M AND  10.0M
 80 365 2100    STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 80 365 2100    HEIGHT=  10.0M     WIND FROM SECTOR   E FOR PREVIOUS    9 HOUR PERIOD
 80 365 2100    HEIGHT= 110.0M   TEMPERATURE=  20.0DEGREES C FOR PREVIOUS    8 HOUR PERIOD
 80 365 2200    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 365 2200    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 365 2200    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN 110.0M AND  60.0M
 80 365 2200    STABILITY CLASS   C  DURING NIGHT BETWEEN 110.0M AND  60.0M
 80 365 2200    STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 80 365 2300    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 365 2300    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 365 2300    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN 110.0M AND  60.0M
```

```
SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

 YR DAY HOUR
 80 365 2300     STABILITY CLASS   C  DURING NIGHT BETWEEN 110.0M AND  60.0M
 80 365 2300     STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 80 365 2400     WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 365 2400     STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 365 2400     WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN 110.0M AND  60.0M
 80 365 2400     STABILITY CLASS   C  DURING NIGHT BETWEEN 110.0M AND  60.0M
 80 365 2400     STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 80 366  100     WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 366  100     STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 366  100     WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   B  BETWEEN 110.0M AND  60.0M
 80 366  100     STABILITY CLASS   B  DURING NIGHT BETWEEN 110.0M AND  60.0M
 80 366  100     STABILITY CLASS   B  DURING NIGHT BETWEEN  60.0M AND  10.0M
 80 366  200     WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 366  200     LAPSE RATE OF   -3.5 DEGREES C/100METERS EXCEEDS THE AUTOCONVECTIVE LAPSE RATE
 80 366  200     STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 366  200     WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   B  BETWEEN 110.0M AND  60.0M
 80 366  200     STABILITY CLASS   B  DURING NIGHT BETWEEN 110.0M AND  60.0M
 80 366  200     STABILITY CLASS   B  DURING NIGHT BETWEEN  60.0M AND  10.0M
 80 366  300     WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 366  300     LAPSE RATE OF   -3.6 DEGREES C/100METERS EXCEEDS THE AUTOCONVECTIVE LAPSE RATE
 80 366  300     STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 366  300     WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  60.0M
 80 366  300     STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  60.0M
 80 366  300     STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 80 366  400     HEIGHT=  10.0M     DEW POINT (   15.0 ) IS GREATER THEN TEMPERATURE (   14.0 )
 80 366  400     WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 366  400     LAPSE RATE OF   -3.7 DEGREES C/100METERS EXCEEDS THE AUTOCONVECTIVE LAPSE RATE
 80 366  400     STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 366  400     WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  60.0M
 80 366  400     STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  60.0M
 80 366  400     STABILITY CLASS   A  DURING NIGHT BETWEEN  60.0M AND  10.0M
 80 366  500     WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  60.0M
 80 366  500     STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  60.0M
 80 366  500     STABILITY CLASS   A  DURING NIGHT BETWEEN  60.0M AND  10.0M
 80 366  600     WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 366  600     STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 366  600     STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 80 366  600     STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 80 366  800     HEIGHT=  60.0M     WIND FROM SECTOR   N FOR PREVIOUS  12 HOUR PERIOD
 80 366 1000     HEIGHT= 110.0M     WIND FROM SECTOR   N FOR PREVIOUS  14 HOUR PERIOD
 80 366 1200     HEIGHT=  10.0M   TEMPERATURE GREATER THEN DEW POINT BY  10.0 DEGREES C DURING PRECIPITATION OF  50.0 MM
 80 366 1200     PRECIPITATION OF   50.0MM FELL IN THE GIVEN 1 HOUR PERIOD
 80 366 1200     PRECIPITATION OCCURED DURING STABILITY CLASS   F  BETWEEN 110.0M AND  10.0M
 80 366 1200     STABILITY CLASS   F  DURING DAY BETWEEN 110.0M AND  10.0M
 80 366 1300     HEIGHT=  10.0M   TEMPERATURE GREATER THEN DEW POINT BY  13.0 DEGREES C DURING PRECIPITATION OF 100.0 MM
 80 366 1300     PRECIPITATION OF  100.0MM FELL IN THE GIVEN 1 HOUR PERIOD
 80 366 1400     HEIGHT=  60.0M     WIND SPEED OF  40.0M/SEC OCCURRED
 80 366 1500     WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 366 1500     STABILITY CLASS JUMPED FROM   E  TO   A OVER ONE HOUR PERIOD BETWEEN 110.0M AND  10.0M
 80 366 1500     STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 80 366 1500     STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 80 366 1600     WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 366 1600     STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 80 366 1600     STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
```

```
PROGRAM: QA          VERSION: 2        DATED: FEBRUARY 1982        RUN DATE:    FRIDAY           MAY 14, 1982         PAGE:   4

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

 YR DAY HOUR
 80 366 1700    HEIGHT= 110.0M    DEW POINT (  21.0 ) IS GREATER THEN TEMPERATURE (  20.0 )
 80 366 1700    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 80 366 1700    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 80 366 1800    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 366 1800    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 366 1800    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 80 366 1800    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 80 366 1900    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 366 1900    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 366 1900    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 80 366 1900    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 80 366 2000    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN  60.0M AND  10.0M
 80 366 2000    STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 80 366 2000    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 80 366 2000    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 80 366 2100    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 366 2100    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 366 2100    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 80 366 2100    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 80 366 2100    HEIGHT= 110.0M   TEMPERATURE=  20.0DEGREES C FOR PREVIOUS    8 HOUR PERIOD
 80 366 2200    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN 110.0M AND  60.0M
 80 366 2200    STABILITY CLASS   C  DURING NIGHT BETWEEN 110.0M AND  60.0M
 80 366 2200    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 80 366 2200    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 80 366 2300    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 366 2300    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 366 2300    STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 80 366 2300    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 80 366 2300    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   E
 80 366 2400    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 80 366 2400    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 80 366 2400    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   F
 80 366 2400    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   E
 81   1  100    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81   1  100    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81   1  100    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   B  BETWEEN 110.0M AND  60.0M
 81   1  100    STABILITY CLASS   B  DURING NIGHT BETWEEN 110.0M AND  60.0M
 81   1  100    STABILITY CLASS   B  DURING NIGHT BETWEEN  60.0M AND  10.0M
 81   1  100    STABILITY CLASS JUMPED FROM   F  TO   B OVER ONE HOUR PERIOD BETWEEN  60.0M AND  10.0M
 81   1  200    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81   1  200    LAPSE RATE OF   -3.5 DEGREES C/100METERS EXCEEDS THE AUTOCONVECTIVE LAPSE RATE
 81   1  200    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81   1  200    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   B  BETWEEN 110.0M AND  60.0M
 81   1  200    STABILITY CLASS   B  DURING NIGHT BETWEEN 110.0M AND  60.0M
 81   1  200    STABILITY CLASS   B  DURING NIGHT BETWEEN  60.0M AND  10.0M
 81   1  300    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81   1  300    LAPSE RATE OF   -3.6 DEGREES C/100METERS EXCEEDS THE AUTOCONVECTIVE LAPSE RATE
 81   1  300    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81   1  300    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  60.0M
 81   1  300    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  60.0M
 81   1  300    STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 81   1  400    HEIGHT=  10.0M    DEW POINT (  15.0 ) IS GREATER THEN TEMPERATURE (  14.0 )
 81   1  400    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   G  BETWEEN 110.0M AND  10.0M
 81   1  400    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   G  BETWEEN 110.0M AND  60.0M
```

```
PROGRAM: QA          VERSION: 2          DATED: FEBRUARY 1982          RUN DATE:     FRIDAY              MAY 14, 1982           PAGE:   5

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

 YR  DAY  HOUR
 81    1   400    STABILITY CLASS JUMPED FROM    A  TO   G OVER ONE HOUR PERIOD BETWEEN 110.0M AND  10.0M
 81    1   400    STABILITY CLASS JUMPED FROM    A  TO   G OVER ONE HOUR PERIOD BETWEEN 110.0M AND  60.0M
 81    1   500    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   G  BETWEEN 110.0M AND  60.0M
 81    1   600    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81    1   600    STABILITY FOR 110.0M MINUS  10.0M IS    G WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 81    1   600    STABILITY FOR 110.0M MINUS  10.0M IS    G WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 81    1   700    HEIGHT= 110.0M      WIND FROM SECTOR    N FOR PREVIOUS   11 HOUR PERIOD
 81    1   800    LAPSE RATE OF   -5.0 DEGREES C/100METERS EXCEEDS THE AUTOCONVECTIVE LAPSE RATE
 81    1   800    STABILITY FOR 110.0M MINUS  10.0M IS    D WHILE STABILITY FOR  60.0M MINUS  10.0M IS   A
 81    1   800    STABILITY FOR 110.0M MINUS  60.0M IS    D WHILE STABILITY FOR  60.0M MINUS  10.0M IS   A
 81    1   900    STABILITY FOR 110.0M MINUS  10.0M IS    E WHILE STABILITY FOR  60.0M MINUS  10.0M IS   A
 81    1   900    STABILITY FOR 110.0M MINUS  60.0M IS    E WHILE STABILITY FOR  60.0M MINUS  10.0M IS   A
 81    1  1000    STABILITY FOR 110.0M MINUS  10.0M IS    E WHILE STABILITY FOR  60.0M MINUS  10.0M IS   A
 81    1  1000    STABILITY FOR 110.0M MINUS  60.0M IS    E WHILE STABILITY FOR  60.0M MINUS  10.0M IS   A
 81    1  1200    HEIGHT=  10.0M   TEMPERATURE GREATER THEN DEW POINT BY  10.0 DEGREES C DURING PRECIPITATION OF   2.0 MM
 81    1  1200    PRECIPITATION OCCURED DURING STABILITY CLASS   F  BETWEEN 110.0M AND  10.0M
 81    1  1200    STABILITY CLASS   F  DURING DAY BETWEEN 110.0M AND  10.0M
 81    1  1300    HEIGHT=  10.0M   TEMPERATURE GREATER THEN DEW POINT BY  13.0 DEGREES C DURING PRECIPITATION OF  11.0 MM
 81    1  1400    HEIGHT=  10.0M   TEMPERATURE GREATER THEN DEW POINT BY  16.0 DEGREES C DURING PRECIPITATION OF  32.0 MM
 81    1  1400    PRECIPITATION OF   32.0MM FELL IN THE GIVEN 1 HOUR PERIOD
 81    1  1600    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81    1  1600    STABILITY FOR 110.0M MINUS  10.0M IS    A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 81    1  1600    STABILITY FOR 110.0M MINUS  10.0M IS    A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   E
 81    1  1700    HEIGHT= 110.0M     DEW POINT (   21.0 ) IS GREATER THEN TEMPERATURE (  20.0 )
 81    1  1700    STABILITY FOR 110.0M MINUS  10.0M IS    A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 81    1  1700    STABILITY FOR 110.0M MINUS  10.0M IS    A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   E
 81    1  1800    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81    1  1800    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81    1  1800    STABILITY FOR 110.0M MINUS  10.0M IS    A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 81    1  1800    STABILITY FOR 110.0M MINUS  10.0M IS    A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   E
 81    1  1900    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81    1  1900    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81    1  1900    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN  60.0M AND  10.0M
 81    1  1900    STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 81    1  1900    STABILITY FOR 110.0M MINUS  10.0M IS    A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 81    1  1900    STABILITY FOR 110.0M MINUS  10.0M IS    A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   E
 81    1  2000    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81    1  2000    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81    1  2000    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN  60.0M AND  10.0M
 81    1  2000    STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 81    1  2000    STABILITY FOR 110.0M MINUS  10.0M IS    A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 81    1  2100    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81    1  2100    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81    1  2100    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN 110.0M AND  60.0M
 81    1  2100    STABILITY CLASS   C  DURING NIGHT BETWEEN 110.0M AND  60.0M
 81    1  2100    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN  60.0M AND  10.0M
 81    1  2100    STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 81    1  2100    HEIGHT= 110.0M   TEMPERATURE=  20.0DEGREES C FOR PREVIOUS    8 HOUR PERIOD
 81    1  2200    STABILITY CLASS   C  DURING NIGHT BETWEEN 110.0M AND  60.0M
 81    1  2200    STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 81    1  2300    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81    1  2300    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81    1  2300    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN 110.0M AND  60.0M
 81    1  2300    STABILITY CLASS   C  DURING NIGHT BETWEEN 110.0M AND  60.0M
```

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PROGRAM: QA          VERSION: 2         DATED: FEBRUARY 1982         RUN DATE:    FRIDAY            MAY 14, 1982          PAGE:   6

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

 YR DAY HOUR
 81   1 2300    STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 81   1 2400    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81   1 2400    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81   1 2400    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   C  BETWEEN 110.0M AND  60.0M
 81   1 2400    STABILITY CLASS   C  DURING NIGHT BETWEEN 110.0M AND  60.0M
 81   1 2400    STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 81   2  100    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81   2  100    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81   2  100    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   B  BETWEEN 110.0M AND  60.0M
 81   2  100    STABILITY CLASS   B  DURING NIGHT BETWEEN 110.0M AND  60.0M
 81   2  100    STABILITY CLASS   B  DURING NIGHT BETWEEN  60.0M AND  10.0M
 81   2  200    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81   2  200    LAPSE RATE OF   -3.5 DEGREES C/100METERS EXCEEDS THE AUTOCONVECTIVE LAPSE RATE
 81   2  200    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81   2  200    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   B  BETWEEN 110.0M AND  60.0M
 81   2  200    STABILITY CLASS   B  DURING NIGHT BETWEEN 110.0M AND  60.0M
 81   2  200    STABILITY CLASS   B  DURING NIGHT BETWEEN  60.0M AND  10.0M
 81   2  300    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81   2  300    LAPSE RATE OF   -3.6 DEGREES C/100METERS EXCEEDS THE AUTOCONVECTIVE LAPSE RATE
 81   2  300    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81   2  300    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  60.0M
 81   2  300    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  60.0M
 81   2  300    STABILITY CLASS   C  DURING NIGHT BETWEEN  60.0M AND  10.0M
 81   2  400    HEIGHT=  10.0M     DEW POINT (   15.0 ) IS GREATER THEN TEMPERATURE (   14.0 )
 81   2  400    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81   2  400    LAPSE RATE OF   -3.7 DEGREES C/100METERS EXCEEDS THE AUTOCONVECTIVE LAPSE RATE
 81   2  400    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81   2  400    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  60.0M
 81   2  400    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  60.0M
 81   2  400    STABILITY CLASS   A  DURING NIGHT BETWEEN  60.0M AND  10.0M
 81   2  500    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  60.0M
 81   2  500    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  60.0M
 81   2  500    STABILITY CLASS   A  DURING NIGHT BETWEEN  60.0M AND  10.0M
 81   2  600    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  10.0M
 81   2  600    STABILITY CLASS   A  DURING NIGHT BETWEEN 110.0M AND  10.0M
 81   2  600    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   D
 81   2  600    STABILITY FOR 110.0M MINUS  10.0M IS   A WHILE STABILITY FOR 110.0M MINUS  60.0M IS   D
 81   2  800    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN 110.0M AND  60.0M
 81   2  800    STABILITY CLASS   G  DURING DAY BETWEEN  60.0M AND  10.0M
 81   2  800    STABILITY FOR 110.0M MINUS  10.0M IS   D WHILE STABILITY FOR  60.0M MINUS  10.0M IS   G
 81   2  800    STABILITY FOR 110.0M MINUS  60.0M IS   A WHILE STABILITY FOR  60.0M MINUS  10.0M IS   G
 81   2  800    STABILITY FOR 110.0M MINUS  10.0M IS   D WHILE STABILITY FOR 110.0M MINUS  60.0M IS   A
 81   2  800    HEIGHT=  60.0M      WIND FROM SECTOR   N FOR PREVIOUS  12 HOUR PERIOD
 81   2  900    STABILITY CLASS JUMPED FROM   A  TO   E OVER ONE HOUR PERIOD BETWEEN 110.0M AND  60.0M
 81   2 1000    HEIGHT= 110.0M      WIND FROM SECTOR   N FOR PREVIOUS  14 HOUR PERIOD
 81   2 1100    WIND SPEED GREATER THEN 7.5M/SEC FOR STABILITY CLASS   A  BETWEEN  60.0M AND  10.0M
 81   2 1100    PRECIPITATION OCCURED DURING STABILITY CLASS   A  BETWEEN  60.0M AND  10.0M
 81   2 1100    STABILITY CLASS JUMPED FROM   E  TO   A OVER ONE HOUR PERIOD BETWEEN  60.0M AND  10.0M
 81   2 1100    STABILITY FOR 110.0M MINUS  10.0M IS   E WHILE STABILITY FOR  60.0M MINUS  10.0M IS   A
 81   2 1100    STABILITY FOR 110.0M MINUS  60.0M IS   E WHILE STABILITY FOR  60.0M MINUS  10.0M IS   A
```

```
PROGRAM: QA         VERSION: 2        DATED: FEBRUARY 1982        RUN DATE:    FRIDAY             MAY 14, 1982          PAGE:   7

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

NUMBER OF OCCURRANCES OF WS AT 110.0M LOWER THEN THE WS AT  60.0M EQUALS     10

NUMBER OF OCCURRANCES OF WS AT  60.0M LOWER THEN THE WS AT  10.0M EQUALS     40

NUMBER OF OCCURRANCES OF WS AT 110.0M LOWER THEN THE WS AT  10.0M EQUALS     20

NUMBER OF OCCURRANCES OF WD AT 110.0M EQUAL TO WD AT  60.0M EQUALS      0

NUMBER OF OCCURRANCES OF WD AT  60.0M EQUAL TO WD AT  10.0M EQUALS      1

NUMBER OF OCCURRANCES OF WD AT 110.0M EQUAL TO WD AT  10.0M EQUALS      0

NUMBER OF OCCURRANCES OF WS AT 110.0M EQUAL TO WS AT  60.0M EQUALS      5

NUMBER OF OCCURRANCES OF WS AT  60.0M EQUAL TO WS AT  10.0M EQUALS      3

NUMBER OF OCCURRANCES OF WS AT 110.0M EQUAL TO WS AT  10.0M EQUALS      3

WD DIFFERENCE BETWEEN 110.0M AND  60.0M IS GREATER THEN OR EQUAL TO 22.5 DEGREES AND
          WS AT EITHER LEVEL IS GREATER THEN OR EQUAL TO 2.5M/SEC      OCCURRANCES=   29
          WS AT EITHER LEVEL IS GREATER THEN OR EQUAL TO 5.0M/SEC      OCCURRANCES=   29
          WS AT EITHER LEVEL IS GREATER THEN OR EQUAL TO 7.5M/SEC      OCCURRANCES=   28

WD DIFFERENCE BETWEEN  60.0M AND  10.0M IS GREATER THEN OR EQUAL TO 22.5 DEGREES AND
          WS AT EITHER LEVEL IS GREATER THEN OR EQUAL TO 2.5M/SEC      OCCURRANCES=   33
          WS AT EITHER LEVEL IS GREATER THEN OR EQUAL TO 5.0M/SEC      OCCURRANCES=   30
          WS AT EITHER LEVEL IS GREATER THEN OR EQUAL TO 7.5M/SEC      OCCURRANCES=   27

WD DIFFERENCE BETWEEN 110.0M AND  10.0M IS GREATER THEN OR EQUAL TO 22.5 DEGREES AND
          WS AT EITHER LEVEL IS GREATER THEN OR EQUAL TO 2.5M/SEC      OCCURRANCES=   49
          WS AT EITHER LEVEL IS GREATER THEN OR EQUAL TO 5.0M/SEC      OCCURRANCES=   49
          WS AT EITHER LEVEL IS GREATER THEN OR EQUAL TO 7.5M/SEC      OCCURRANCES=   47
```

```
PROGRAM: QA         VERSION: 2         DATED: FEBRUARY 1982        RUN DATE:    FRIDAY             MAY 14, 1982          PAGE:    8
SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)
                                          SUMMARY OF MAXIMUM AND MINIMUN VALUES

                                        110.0 M                   60.0 M                    10.0 M
                                 ---------------------     ---------------------     ---------------------

                                  HRS    MIN    MAX         HRS    MIN    MAX         HRS    MIN    MAX
                                 -----  -----  -----       -----  -----  -----       -----  -----  -----

WIND DIRECTION (DEG)               66    1.0  360.0          68    0.0  360.0          60   10.0  328.0
WIND SPEED (M/S)                   69    1.0   18.0          68    0.1   40.0          50    1.0   20.0
TEMPERATURE (DEG C)                69   12.0   22.0          66   14.0   26.5          72   13.0   30.0
MOISTURE (DEG C OR %)              72   10.0   21.0           0  999.9  -99.9          69   10.0   24.0


                                   110.0 -  10.0 M           110.0 -  60.0 M            60.0 -  10.0 M
                                 ---------------------     ---------------------     ---------------------

DELTA T (DEG C/100M)               63   -3.7    5.0          66   -2.1    4.8          66   -5.0    7.5


                                                                                        GROUND LEVEL
                                                                                     ---------------------

PRECIPITATION (MM)                                                                     64    0.0  100.0
```

9.0 STABQ

9.1 Description of Program

STABQ reads hourly values of temperature gradient (delta-T) or sigma theta from a data set in the NRC Standard Format and summarizes the data according to stability class and continuous periods of occurrence.

5.2 Input Cards

Card	Column	Format	Variable	Description
1	1-72	10A4	TITLE	Title that will be printed at top of each page of output.
2	1	I1	IS	Stability criteria: IS=1, Delta-T IS=2, Sigma Theta
	2-8	1x,3I2	JY, JM, JD	Starting year, month and day
	9-15	1x, 3I2	KY, KM, KD	Ending year, month and day

9.3 Discussion of Output

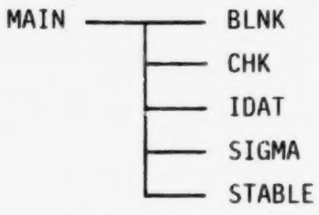
Three tables are printed; one for each of the possible stability levels available from the three measurement levels. Stability data is summarized by periods of occurrence with the longest single period of occurrence also given. If a missing data value is encoutnered, the period of occurrence will end.

9.4 Implementation

Input Units
- 1 - data file of hourly meteorological data in the NRC Standard Format
- 5 - input cards 1 and 2

Output Unit
- - defaults to printer

9.5 Subroutine Flow Chart



9.6 Subroutine Descriptions

Except for MAIN all subroutines are listed alphabetically.

MAIN

The main part of the program reads in the data, makes all summaries and prints out the results.

BLNK

Checks for and converts blank data fields to 9999.9.

CHK

This routine categorizes the occurrence intervals of the stabilities into periods of 1,2,3,4,5,6,7-11, 12-23, 24-47, 48-71, 72-95, 96-119 and greater than 119 hours.

IDAT

This routine converts a specified month and day to an equivalent Julian day.

SIGMA

This routine computes stability class from the horizontal deviation of wind direction (sigma theta) as follows.

Sigma theta (degrees)	Category	Stability Class
$22.5 \le \sigma\theta$	1	A
$17.5 \le \sigma\theta < 22.5$	2	B
$12.5 \le \sigma\theta < 17.5$	3	C
$7.5 \le \sigma\theta < 12.5$	4	D
$3.8 \le \sigma\theta < 7.5$	5	E
$2.1 \le \sigma\theta < 3.8$	6	F
$\sigma\theta < 2.1$	7	G

STABLE

This routine computes the stability class from atmospheric temperature gradient (delta-T) as follows.

Delta-T (°C/100m)	Category	Stability Class
$\Delta T \le -1.9$	1	A
$-1.9 < \Delta T \le -1.7$	2	B
$-1.7 < \Delta T \le -1.5$	3	C
$-1.5 < \Delta T \le -0.5$	4	D
$-0.5 < \Delta T \le 1.5$	5	E
$1.5 < \Delta T \le 4.0$	6	F
$4.0 < \Delta T$	7	G

9.7 Sample Output

```
PROGRAM: STABQ          VERSION: 2          DATED: FEBRUARY 1982                RUN DATE:    FRIDAY            MAY  7, 1982

             TEST  DATA
            ----------
 CONTAINS DATA FROM DECEMBER 1980 TO JANUARY 1891

 HOURLY DATA CODED 0100 TO 2400

*******************************************************





INPUT OPTIONS:

TITLE: SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

COMPUTE STABILITY BASED ON: DELTA-T

START DATE: 80 12 30
END   DATE: 81  1  2
```

```
PROGRAM: STABQ          VERSION: 2          DATED: FEBRUARY 1982                RUN DATE:    FRIDAY            MAY  7, 1982

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

STABILITY BASED ON DELTA-T BETWEEN 110.0- 10.0 METERS

                               NUMBER OF OCCURENCES
 PERIOD OF
 OCCURENCE                                  STABILITY
  (HOURS)             A       B       C       D       E       F       G
 ---------           ---     ---     ---     ---     ---     ---     ---

     1                4       0       0       0       1       3       1

     2                3       0       0       3       2       0       0

     3                0       0       0       0       3       0       0

     4                1       0       0       0       0       0       0

     5                1       0       0       0       0       0       0

     6                1       0       0       0       0       0       0

   7-11               0       0       0       0       0       0       0

  12-23               1       0       0       0       0       0       0

  24-47               0       0       0       0       0       0       0

  48-71               0       0       0       0       0       0       0

  72-95               0       0       0       0       0       0       0

  96-119              0       0       0       0       0       0       0

    >120              0       0       0       0       0       0       0

LONGEST CASE         14       0       0       2       3       1       1
```

```
PROGRAM: STABQ          VERSION: 2          DATED: FEBRUARY 1982               RUN DATE:    FRIDAY           MAY  7, 1982

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

STABILITY BASED ON DELTA-T BETWEEN 110.0- 60.0 METERS

                                NUMBER OF OCCURENCES
 PERIOD OF
 OCCURENCE                            STABILITY
 (HOURS)           A       B       C       D       E       F       G
 ---------        ---     ---     ---     ---     ---     ---     ---

     1             2       0       1       2       0       0       0

     2             0       3       0       2       1       0       1

     3             2       0       0       3       2       0       0

     4             0       0       2       0       0       0       0

     5             0       0       0       0       0       0       0

     6             0       0       0       1       2       0       0

   7-11            0       0       0       0       0       0       0

  12-23            0       0       0       0       0       0       0

  24-47            0       0       0       0       0       0       0

  48-71            0       0       0       0       0       0       0

  72-95            0       0       0       0       0       0       0

  96-119           0       0       0       0       0       0       0

    >120           0       0       0       0       0       0       0

LONGEST CASE       3       2       4       6       6       0       2
```

```
PROGRAM: STABQ          VERSION: 2          DATED: FEBRUARY 1982                RUN DATE:     FRIDAY            MAY  7, 1982

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

STABILITY BASED ON DELTA-T BETWEEN  60.0- 10.0 METERS

                                       NUMBER OF OCCURENCES
 PERIOD OF
 OCCURENCE                                   STABILITY
  (HOURS)              A       B       C       D       E       F       G
 ---------            ---     ---     ---     ---     ---     ---     ---

     1                 2       0       5       0       0       2       2

     2                 2       3       0       3       1       0       0

     3                 0       0       0       1       1       0       0

     4                 0       0       0       2       0       0       0

     5                 0       0       0       0       1       0       0

     6                 0       0       2       0       1       0       0

    7-11               0       0       0       0       0       0       0

   12-23               0       0       0       0       0       0       0

   24-47               0       0       0       0       0       0       0

   48-71               0       0       0       0       0       0       0

   72-95               0       0       0       0       0       0       0

   96-119              0       0       0       0       0       0       0

     >120              0       0       0       0       0       0       0

LONGEST CASE           2       2       6       4       6       1       1
```

10.0 TDP

10.1 Description of Program

This program determines the average, minimum and maximum values of temperature, dew point, wind speed and wet bulb from hourly data in the NRC Standard Format. The average value for wind speed is the root-mean-square wind speed and wet bulb is calculated from temperature, dew point and barometric pressure.

10.2 Input Cards

Card	Column	Format	Variable	Description
1	1-72	18A4	TITLE	Title to be printed at the top of each page of the output.
2	1-10	F10.0	PBAR	Barometric pressure (inches of Mercury)
3	1-6	3I2	LY1, LM1, LD1	Start date (year, month and day)
	7	1x		Blank
	8-13	3I2	LY2, LM2, LD2	End date (year, month and day)

10.3 Discussion of Output

Printed output from TDP contains both monthly and annual summaries for all three possible levels in the NRC Standard Format. If a level has no available data, then the output will indicate all missing data. Also printed out are the number of valid data values that were used to determine each of the results.

Wet bulb temperature is calculated from temperature, dew point and the barometric pressure inputted on Card 2. If dew point is greater than temperature for a given hour, the dew point value is assumed to be invalid and not used.

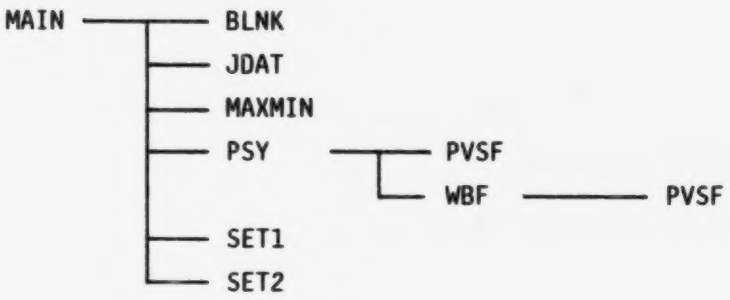
Dew point is read from the field labeled "moisture" in the NRC Standard Format. In the event that dew point is not located there, the format of the read statement will have to be modified so that dew point will be read. Similarly if wet bulb were already available, the program would have to be modified not calculate it, but use it directly.

10.4 Implementation

Input Units
1 - data file of hourly meterological data in the NRC Standard Format
5 - input cards 1, 2, and 3

Output Units
- defaults to printer

10.5 Subroutine Flow Chart



10.6 Subroutine Descriptions

Except for MAIN all subroutines are listed alphabetically.

MAIN

The main part of the program reads in all data, makes all summarizations and prints out the results.

BLNK

Checks for blank data fields and converts them to 9999.9.

JDAT

This routine converts a given Julian day to an equivalent month and day.

MAXMIN

This routine determines the maximum and minimum values on a monthly basis for each of the variables.

PSY

This routine calculates the wet bulb temperature (degrees F), humidity ratio (lb of water vapor/lb of dry air), enthalpy (BTU's/lb of dry air), volume (cubic feet/lb of dry air), vapor pressure (inches of Mercury) and relative humidity (fraction, not percent) from temperature (degrees F), dew point (Degrees F), and barometric pressure (inches of Mercury).

The source of this subroutine is: NUREG-0693, Analysis of Ultimate Heat Sink Cooling Ponds, by R. Codell and W. K. Nuttle, USNRC, November 1980, p. 104.

PVSF

This function calculates the vapor pressure of water (inches of Mercury) as a function of temperature (degrees F). The source of this function is: NUREG-0693, Analysis of Ultimate Heat Sink Cooling Ponds, by R. Codell and W. K. Nuttle, USNRC, November 1980, pp. 104-105.

SET1, SET2

These routines are used to initialize data.

WBF

This function approximates the wet bulb temperature (degrees F) from enthalpy (BTU's/lb of dry air) and barometric pressure (inches of Mercury). The source of this routine is: NUREG-0693, Analysis of Ultimate Heat Sink Cooling Ponds, by R. Codell and W. K. Nuttle, USNRC, November 1980, p. 105.

10.7 Sample Output

```
PROGRAM: TDP          VERSION: 3          DATED: MARCH 1982               RUN DATE:    FRIDAY           MAY  7, 1982
SITE:

             TEST  DATA

            ----------

 CONTAINS DATA FROM DECEMBER 1980 TO JANUARY 1891

 HOURLY DATA CODED 0100 TO 2400

*******************************************************




TITLE: SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)



INPUT DATA:

BAROMETRIC PRESSURE:    29.0

START DATE: 80 12 30
END   DATE: 81  1  2


*** WIND SPEED IS ROOT-MEAN-SQUARE WIND SPEED
*** WET BULB IS CALCULATED FROM TEMPERATURE, DEW POINT AND PRESSURE
```

```
PROGRAM: TDP          VERSION: 3          DATED: MARCH 1982               RUN DATE:    FRIDAY            MAY  7, 1982
SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)
                                            110.0 METERS                  60.0 METERS                  10.0 METERS
                                      -----------------------     -----------------------     -----------------------
YEAR  MONTH                             AVG   MIN   MAX   HRS        AVG   MIN   MAX   HRS        AVG   MIN   MAX   HRS
---- --------                         ----- ----- ----- -----      ----- ----- ----- -----      ----- ----- ----- -----

1980 DECEMBER  WIND SPEED  (M/S)       10.8   1.0  18.0    37        9.3   0.1  40.0    36       12.1   1.0  20.0    27
               TEMPERATURE  (C)        19.4  12.0  22.0    36       21.8  14.0  26.5    35       22.5  13.0  30.0    37
               DEW POINT    (C)        16.0  10.0  21.0    37      999.9  99.9 -99.9     0       16.8  10.0  24.0    36
               WET BULB     (C)        17.4  11.7  20.9    34      999.9  99.9 -99.9     0       19.3  13.4  24.3    35


1980 ANNUAL    WIND SPEED  (M/S)       10.8   1.0  18.0    37        9.3   0.1  40.0    36       12.1   1.0  20.0    27
               TEMPERATURE  (C)        19.4  12.0  22.0    36       21.8  14.0  26.5    35       22.5  13.0  30.0    37
               DEW POINT    (C)        16.0  10.0  21.0    37      999.9  99.9 -99.9     0       16.8  10.0  24.0    36
               WET BULB     (C)        17.4  11.7  20.9    34      999.9  99.9 -99.9     0       19.3  13.4  24.3    35



*** WIND SPEED IS ROOT-MEAN-SQUARE WIND SPEED
*** WET BULB IS CALCULATED FROM TEMPERATURE, DEW POINT AND PRESSURE
```

```
PROGRAM: TDP          VERSION: 3          DATED: MARCH 1982               RUN DATE:    FRIDAY            MAY  7, 1982

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

                                                 110.0 METERS                  60.0 METERS                   10.0 METERS
                                             -----------------------     -----------------------     -----------------------
YEAR  MONTH                                   AVG   MIN   MAX   HRS       AVG   MIN   MAX   HRS       AVG   MIN   MAX   HRS
----  --------                               ----- ----- ----- -----     ----- ----- ----- -----     ----- ----- ----- -----

1981  JANUARY     WIND SPEED  (M/S)           10.8   1.0  18.0    32       8.5   0.1  24.0    32      10.1   1.0  20.0    23
                  TEMPERATURE  (C)            18.2  12.0  22.0    33      20.0  14.0  26.5    31      20.4  13.0  30.0    35
                  DEW POINT    (C)            13.9  10.0  21.0    35     999.9  99.9 -99.9     0      17.3  10.0  24.0    33
                  WET BULB     (C)            15.7  11.7  20.9    32     999.9  99.9 -99.9     0      19.1  13.4  24.3    31


1981  ANNUAL      WIND SPEED  (M/S)           10.8   1.0  18.0    32       8.5   0.1  24.0    32      10.1   1.0  20.0    23
                  TEMPERATURE  (C)            18.2  12.0  22.0    33      20.0  14.0  26.5    31      20.4  13.0  30.0    35
                  DEW POINT    (C)            13.9  10.0  21.0    35     999.9  99.9 -99.9     0      17.3  10.0  24.0    33
                  WET BULB     (C)            15.7  11.7  20.9    32     999.9  99.9 -99.9     0      19.1  13.4  24.3    31



*** WIND SPEED IS ROOT-MEAN-SQUARE WIND SPEED
*** WET BULB IS CALCULATED FROM TEMPERATURE, DEW POINT AND PRESSURE
```

```
PROGRAM: TDP          VERSION: 3          DATED: MARCH 1982                RUN DATE:    FRIDAY            MAY  7, 1982

SAMPLE RUN : INPUT FILE = DATA1  (SEE SAMPLE OUTPUT FOR PROGRAM PRINT)

                                             110.0 METERS                  60.0 METERS                  10.0 METERS
DECEMBER 30, 1980                     -----------------------     -----------------------     -----------------------
          TO                            AVG   MIN   MAX   HRS       AVG   MIN   MAX   HRS       AVG   MIN   MAX   HRS
JANUARY   2, 1981                     ----- ----- ----- -----     ----- ----- ----- -----     ----- ----- ----- -----

               WIND SPEED  (M/S)       10.8   1.0  18.0    69       8.9   0.1  40.0    68      11.3   1.0  20.0    50
               TEMPERATURE  (C)        18.8  12.0  22.0    69      21.0  14.0  26.5    66      21.5  13.0  30.0    72
               DEW POINT    (C)        15.0  10.0  21.0    72     999.9  99.9 -99.9     0      17.0  10.0  24.0    69
               WET BULB     (C)        16.6  11.7  20.9    66     999.9  99.9 -99.9     0      19.2  13.4  24.3    66


*** WIND SPEED IS ROOT-MEAN-SQUARE WIND SPEED
*** WET BULB IS CALCULATED FROM TEMPERATURE, DEW POINT AND PRESSURE
```

APPENDIX A

NRC STANDARD FORMAT FOR METEOROLOGICAL DATA

Use: 9 track tape (7 will be acceptable)
Stnadard Label, which would include
  Record Length = 160 characters
  Block Size = 3200 characters (fixed block size)
  Density = 1600 BPI preferred (6250 or 800 PBI will be accepted)

Do not use: Magnetic tapes with unformatted or spanned records.

At the beginning of each tape, use the first five records (which is the equivalent of ten cards) to give a tape description. Include plant name and location (latitude, longitude), dates of data, information explaining data contained in the "other" fields if they are used, height of measurements, and any additional information pertinent to identification of the tape. Make sure all five records are included, even if some are blank. Format for the first five records will be 160A1. Meteorological data format is (I6, I2, I3, I4, 25F5.1, F5.2, 3F5.1). Decimal points should not be included when copying data onto the tape.

All data should be given to a tenth of a unit except solar radiation, which should be given to a hundredth of a unit. This does not necessarily indicate the accuracy of the data (e.g., wind direction is usually given to the nearest degree, but record it with a zero in the tenth's place; therefore, 275 degrees would be 275.0 degrees and placed on the tape as 2750). All nines in any field should indicate a lost record (99999). All sevens in a wind direction field should indicate calm (77777). If only two levels of data are monitored, use the upper and lower level fields. If only one level of data is monitored, use the upper level field.

TABLE A-1

MAGNETIC TAPE METEORLOGICAL DATA

LOCATION:
DATE OF DATA RECORD:

		ACCURACY
I6	Identifier (can be anything)	
I2	Year	
I3	Julian Day	
I4	Hour (on 24-hr clock)	
F5.1	Upper Measurements: Level = _____ meters	
F5.1	Wind Direction (degrees)	________
F5.1	Wind Speed (m/s)	________
F5.1	Sigma Theta (degrees)	________
F5.1	Ambient Temperature (°C)	________
F5.1	Moisture: _________	________
F5.1	Other: ____________	________
F5.1	Intermediate Measurements: Level = _____ meters	
F5.1	Wind Direction (degrees)	________
F5.1	Wind Speed (m/s)	________
F5.1	Sigma Theta (degrees)	________
F5.1	Ambient Temperature (°C)	________
F5.1	Moisture: _________	________
F5.1	Other: ____________	________
F5.1	Lower Measurements: Level = _____ meters	
F5.1	Wind Direction (degrees)	________
F5.1	Wind Speed (m/s)	________
F5.1	Sigma Theta (degrees)	________
F5.1	Ambient Temperature (°C)	________
F5.1	Moisture: ________	________
F5.1	Other: ___________	________
F5.1	Temp Diff (Upper-Lower) (°C/100 meters)	________
F5.1	Temp Diff (Upper-Intermediate) (°C/100 meters)	________
F5.1	Temp Diff (Intermediate-Lower) (°C/100 meters)	________
F5.1	Precipitation (mm)	________
F5.2	Solar Radiation (cal/cm^2/min)	________
F5.1	Visibility (km)	________
F5.1	Other: __________	________
F5.1	Other: __________	________

APPENDIX B

PROGRAM LISTING OF DATE

```
C
C ***********************************************************
C *                                                         *
C *                          DATE                           *
C *                                                         *
C *             THIS PROGRAM CHECKS FOR THE SEQUENTIAL      *
C *             STORAGE OF DATA IN THE NRC STANDARD FORMAT  *
C *             BY YEAR, JULIAN DAY AND HOUR.               *
C *                                                         *
C * PROGRAMMER: WILLIAM SNELL                               *
C * DATE: MARCH 1982                                        *
C * VERSION: 1                                              *
C *                                                         *
C ***********************************************************
C
      DIMENSION TODAY(8),A(200),TITLE(18),LH(4),LP(2)
      DATA LH/0,1,23,24/,LP/366,365/
C
C  READ AND WRITE OUT HEADING OF DATA FILE
C
      CALL RHB240 (TODAY)
      PRINT 200, TODAY
  200 FORMAT('1','PROGRAM: DATE',10X,'VERSION: 1',10X,
     1 'DATED: MARCH 1982',15X,'RUN DATE: ',8A4)
      READ(1,10) A
   10 FORMAT(4(40A4/),40A4)
      PRINT 11, A
   11 FORMAT('-','SITE:'/'0',10(' ',20A4/))
C
C  READ INPUT CARD
C
C  LL=0    HOURLY DATA CODED 0000-2300
C  LL=1    HOURLY DATA CODED 0100-2400
C  TITLE   IS A TITLE TO BE PRINTED ON EACH PAGE
C
      READ(5,12) LL,TITLE
   12 FORMAT(I1,1X,18A4)
      L1=LH(LL+1)
      L2=LH(LL+3)
      L=L2+1
      PRINT 203, TITLE,L1,L2
  203 FORMAT(///'0','TITLE: ',18A4/'0','HOURLY DATA CODED:
     1 '0',I1,'-',I2)
C
C  INITIALIZE
C
      IR=-1
      ITOT=1
      IT=0
      PRINT 200, TODAY
      PRINT 201, TITLE
  201 FORMAT('0',18A4)
C
C  READ DATA AND CHECK SEQUENCE
C
   20 READ(1,102,END=999) IY,JD,IH
  102 FORMAT(6X,I2,I3,I2)
      IF(IT.EQ.0) PRINT 206, IY,JD,IH
  206 FORMAT('0','DATE OF FIRST DATA RECORD READ: ',I3,I4,I3///)
      IR=IR+1
      GO TO 30
C
   25 READ(1,102,END=999) IY,JD,IH
      IR=IR+1
      K2=IY*100000+JD*100+IH
      IF(K1.EQ.K2) GO TO 30
      IR2=IR+1
      PRINT 208, IY1,JD1,IH1,IR,IY,JD,IH,IR2
  208 FORMAT('0','BAD DATE SEQUENCE IN DATA: ',I3,I4,I3,8X,
     1 'RECORD ',I6/' ',27X,I3,I4,I3,8X,'RECORD ',I6)
C
      ITOT=ITOT+1
      IT=IT+1
      IF(ITOT.LT.15) GO TO 30
      PRINT 200, TODAY
      PRINT 201, TITLE
      ITOT=0
   30 IY1=IY
      JD1=JD
      IH1=IH
      IH=IH+1
      IF(IH.EQ.L) GO TO 35
      K1=IY*100000+JD*100+IH
      GO TO 25
C
   35 JD=JD+1
      Y=IY*0.25
      KY=Y
      IS=(Y-KY)+1.75
      LDY=LP(IS)
      IF(JD.LE.LDY) GO TO 40
      JD=1
      IY=IY+1
C
   40 K1=IY*100000+JD*100+L1
      GO TO 25
C
  999 CONTINUE
      IR2=IR+1
      IF(IT.EQ.0) PRINT 209
  209 FORMAT('0','NO ERRORS FOUND IN DATE SEQUENCE OF DATA')
      PRINT 210, IY1,JD1,IH1,IR2
  210 FORMAT(///'0','DATE OF LAST DATA RECORD READ: ',
     1 I3,I4,I3,8X,'RECORD NO.',I6)
C
      STOP
      END
```

APPENDIX C

PROGRAM LISTING OF JFREQ

```
//WSZJFREQ JOB (WDC1,720,1),W.SNELL
/*CNTL WSZ,EXC
/*ACCESS WDC1WSZ
//STEP2 EXEC FORGCOMP
//COMP.SYSIN DD *
C
C  *******************************************************************
C  *                                                                 *
C  *                             JFREQ                               *
C  *                                                                 *
C  *    THIS PROGRAM CALCULATES JOINT FREQUENCY DISTRIBUTIONS        *
C  *        OF WIND SPEED AND DIRECTION BY STABILITY CLASS           *
C  *           AND PRINTS STABILITY CLASS BY HOUR OF DAY             *
C  *                                                                 *
C  * PROGRAMMER: AUDREY SMITH                                        *
C  * DATE: JUNE 1977        VERSION: 1                               *
C  *                                                                 *
C  * MODIFIED: WILLIAM SNELL                                         *
C  * DATE: NOVEMBER 1978    VERSICN: 2                               *
C  * DATE: FEBRUARY 1982    VERSION: 3                               *
C  *                                                                 *
C  *******************************************************************
C
C
      REAL*8 U
      COMMON/DATA1/ILEV,IS,IP,LSH,IPS,CALM,VB,IY(2),IM(2),
     1  ID(2),A(18)
      COMMON/DATA2/C(12),WWD(3),WWS(3),STAB(3),SST(3)
      DIMENSION TODAY(8),JD(2),TITLE(200),CS(8),IHS(24),
     1          IDATA(10,18,8), DATA(10,18,8),VAR(10),IVAR(10),
     2          ISUMD(18,8), ISUMS(10,8), ISUM(8),
     3          SUMD(18,8), SUMS(10,8), SUM(9),
     4          IWSC(10), SWSC(10), IWS(10), SWS(10),
     5          SC(8), U(11), WIND1(3), WIND2(3), H(3)
C.....
C.....INITIALIZE
C.....
      X=1
      DATA CS/'A','B','C','D','E','F','G','-'/
      DATA SC/'A   ','B   ','C   ','D   ','E   ','F   ','G   ','ALL '/
      DATA U/'  CALM  ',' CALM-.5',' .5-.75 ',' .75-1.0',
     1      ' 1.0-1.5',' 1.5-2.0',' 2.0-3.0',' 3.0-5.0',
     2      '5.0-10.0','  >10.0 ','VARIABLE'/
      DATA IHS/24*8/
      DATA IWSC,SWSC,H/10*0,10*0.,3*0./
      DATA ISUMD,SUMD/144*0,144*0./
      DATA IDATA/1440*0/
      DATA IVAR,IWS,ISUM,ISUMS/108*0/
      DATA VAR,SWS,SUM,SUMS/108*0./
C
      CALL RHB240 (TODAY)
C
10000 CONTINUE
      NUM=0
      LCNT=0
C
C
C.....
C.....READ DATA FROM CARDS
C.....
```

```
      C
      C---------A IS THE TITLE CARD
      C---------ILEV INDICATES LEVEL OF WIND DATA TO BE USED
      C                        ILEV=1 FOR UPPER LEVEL
      C                        ILEV=2 FOR INTERMEDIATE LEVEL
      C                        ILEV=3 FOR LOWER LEVEL
      C---------IS INDICATES THE LEVEL USED TO MEASURE STABILITY
      C                        IS=1 FOR DELTA T:  UPPER - LOWER
      C                        IS=2 FOR DELTA T:  UPPER - INTERMEDIATE
      C                        IS=3 FOR DELTA T:  INTERMEDIATE - LOWER
      C                        IS=4 FOR SIGMA THETA:  UPPER
      C                        IS=5 FOR SIGMA THETA:  INTERMEDIATE
      C                        IS=6 FOR SIGMA THETA:  LOWER
      C---------IP=1 PUNCH JFD IN HOURS
      C         IP=0 DO NOT PUNCH JFD
      C---------LSH=0 FOR HOURS CODED 00-23
      C         LSH=1 FOR HOURS CODED 01-24
      C---------IPS=0 DO NOT PRINT STABILITY BY HOUR OF DAY
      C         IPS=1 PRINT STABILITY BY HOUR OF DAY
      C---------CALM IS STARTING SPEED OF ANNEMOMETER (M/S)
      C---------VB = CODE FOR VARIABLE WIND. IF NO WINDS CODED
      C---------          VARIABLE, VB=0
      C---------IY(1),IM(1),ID(1) = STARTING YEAR, MONTH AND DAY
      C---------IY(2),IM(2),ID(2) ENDING YEAR, MONTH AND DAY
      C
            READ (5,200,END=1111) A
        200 FORMAT (18A4)
            READ(5,50) ILEV,IS,IP,LSH,IPS,CALM,VB,
           *  IY(1),IM(1),ID(1),IY(2),IM(2),ID(2)
         50 FORMAT(5I1,F5.2,F7.1/3I2,1X,3I2)
            WRITE(6,38) TODAY
            CALL HEAD1
            CALL IDAY(IL,IM,IY,JD)
            ISRT=IY(1)*1000+JD(1)
            IEND=IY(2)*1000+JD(2)
            LHD=0
      C
      C.....
      C.....READ METEOROLOGICAL DATA
      C.....PRINT STABILITY BY HOUR OF DAY
      C.....
      C
            IF (A.EQ.2) GO TO 1000
            READ (1,444) TITLE
        444 FORMAT (4(40A4/),40A4)
            WRITE(6,38) TODAY
            WRITE (6,445) TITLE
        445 FORMAT ('0','SITE:'/' ',20A4/9(' ',20A4/))
      C
            LHD=1
            GO TO 11
         60 CONTINUE
            GO TO (151,152,153,154,154,154),IS
        151 DT1=H(1)
            DT2=H(3)
            GO TO 154
        152 DT1=H(1)
            DT2=H(2)
            GO TO 154
        153 DT1=H(2)
      DT2=H(3)
  154 CONTINUE
      LHD=0
      IF(IPS.EQ.0) GO TO 61
      WRITE(6,38) TODAY
      IF(IS.LE.3) WRITE (6,20) A,H(ILEV),DT1,DT2
      IF(IS.GE.4) WRITE (6,32) A,H(ILEV),H(IS-3)
      IF(LSH.EQ.0) WRITE(6,36)
      IF(LSH.EQ.1) WRITE(6,39)
      GO TO 61
 1000 CONTINUE
      IF(IPS.EQ.0) GO TO 11
      IF(IHR.LT.24) GO TO 11
      CALL JDAT(IYR,JDAY,IMON,IDAY)
      WRITE(6,37) IYR,IMON,IDAY,(CS(IHS(I)),I=1,24)
      LHC=LHC+1
      IF(LHC.LT.50) GO TO 11
      WRITE(6,38) TODAY
      IF(IS.LE.3) WRITE (6,20) A,H(ILEV),DT1,DT2
      IF(IS.GE.4) WRITE (6,32) A,H(ILEV),H(IS-3)
      IF(LSH.EQ.0) WRITE(6,36)
      IF(LSH.EQ.1) WRITE(6,39)
      LHC=0
C
   11 READ(1,111,END=999) IYR,JDAY,IHR,
     1 ((H(I),WWD(I),WWS(I),SST(I)),I=1,3),
     2 (STAB(N),N=1,3),(C(I),I=1,12)
  111 FORMAT (6X,I2,I3,I2,2X,3(4F5.1,15X),3F5.1,
     * T16,3(5X,3(1X,A4),15X),3(1X,A4))
      IDATE=IYR*1000+JDAY
      IF(IDATE.LT.ISRT) GO TO 11
      IF(IDATE.GT.IEND) GO TO 999
      CALL BLNK
      IF(LHD.EQ.1) GO TO 60
   61 IF(LSH.EQ.0) IHR=IHR+1
      IHS(IHR)=8
      LCNT=LCNT+1
      WD=WWD(ILEV)
      WS=WWS(ILEV)
      IF(IS.GE.4) GO TO 22
      IF(STAB(IS).LT.-7.0 .OR. STAB(IS).GT.35.0) GO TO 1000
      CALL STABLE(STAB(IS),K)
      GO TO 33
   22 ST=SST(IS-3)
      IF(ST.LT.0.0 .OR. ST.GT.360.0) GO TO 1000
      CALL SIGMA(ST,K)
   33 IHS(IHR)=K
C
      IF(WD.EQ.7777.7 .OR. WS.EQ.0.0) GO TO 42
      IF(WS.LT.0.0 .OR. WS.GE.99.9) GO TO 1000
      CALL SPEED(WS,CALM,I)
      IF(WD.EQ.VB) GO TO 41
      IF(WD.LT.0.0 .OR. WD.GT.365.0) GO TO 1000
   41 CONTINUE
      CALL SECTOR(WD,WS,CALM,VB,J)
      GO TO 43
   42 I=1
      J=17
   43 CONTINUE
C.....
```

```
C.....CALCULATE IDATA, NUM, AND DATA
C.....
C
C---------IDATA AND DATA ARE THE FREQUENCIES FOR SPECIFIC WIND
C               SPEEDS WIND DIRECTIONS, AND STABILITY CLASSES IN
C               HOURS AND FRACTIONS, RESPECTIVELY
C---------NUM AND UM ARE THE NUMBER OF HOURS OF DATA
C
      IDATA(I,J,K)=IDATA(I,J,K)+1
      IDATA(I,J,8)=IDATA(I,J,8)+1
      NUM=NUM+1
      GO TO 1000
  999 CONTINUE
      IF (NUM.EQ.0) GO TO 10000
      UM=100.0/NUM
C
      DO 105 I=1,10
      DO 105 J=1,18
      DO 105 K=1,8
  105 DATA(I,J,K)=IDATA(I,J,K)*UM
C
C.....
C.....CALCULATE SUMS OF FREQUENCIES IN HOURS AND FRACTIONS
C.....
C
C---------ISUMD, SUMD = SUMS OF FREQUENCIES FOR EACH DIRECTION IN A
C               STABILITY CLASS IN HOURS AND FRACTIONS, RESPECTIVELY
C---------ISUMS, SUMS = SUMS OF FREQUENCIES FOR EACH WIND SPEED IN A
C               STABILITY CLASS IN HOURS AND FRACTIONS, RESPECTIVELY
C---------ISUM, SUM = TOTALS OF ALL FREQUENCIES IN A STABILITY CLASS
C               IN HOURS AND FRACTIONS, RESPECTIVELY
C---------I,J,K AND L,M,N CORRESPOND TO WIND SPEED, WIND DIRECTION,
C               AND STABILITY
C
      DO 110 M=1,16
      DO 110 N=1,8
      DO 110 I=2,10
      ISUMD(M,N)=ISUMD(M,N)+IDATA(I,M,N)
  110 SUMD(M,N)=SUMD(M,N)+DATA(I,M,N)
C
      DO 115 L=2,10
      DO 115 N=1,8
      DO 115 J=1,16
      ISUMS(L,N)=ISUMS(L,N)+IDATA(L,J,N)
  115 SUMS(L,N)=SUMS(L,N)+DATA(L,J,N)
C
      DO 120 N=1,8
      ISUMS(1,N)=IDATA(1,17,N)
  120 SUMS(1,N)=DATA(1,17,N)
C
      DO 125 L=1,10
      DO 125 N=1,8
      ISUMD(18,N)=ISUMD(18,N)+IDATA(L,18,N)
      SUMD(18,N)=SUMD(18,N)+DATA(L,18,N)
      ISUM(N)=ISUM(N)+ISUMS(L,N)
  125 SUM(N)=SUM(N)+SUMS(L,N)
C
      DO 126 N=1,8
      SUM(N)=SUM(N)+SUMD(18,N)
  126 ISUM(N)=ISUM(N)+ISUMD(18,N)
```

```
C
C.....
C.....CALCULATE OVERALL FREQUENCIES
C.....
C
      DO 145 L=1,10
      DO 145 N=1,7
      IVAR(L)=IVAR(L)+IDATA(L,18,N)
      VAR(L)=VAR(L)+DATA(L,18,N)
      IWS(L)=IWS(L)+ISUMS(L,N)
  145 SWS(L)=SWS(L)+SUMS(L,N)
C
      IWD=0
      SWD=0.
      DO 149 N=1,7
      IWD=IWD+ISUMD(18,N)
  149 SWD=SWD+SUMD(18,N)
C
      IWSC(1)=IWS(1)
      SWSC(1)=SWS(1)
      DO 146 N=2,10
      IWSC(N)=IWSC(N-1)+IWS(N)
  146 SWSC(N)=SWSC(N-1)+SWS(N)
C
C.....
C.....PRINT    JOINT FREQUENCY TABLES AND OVERALL FREQUENCIES
C.....
C
C
      PCDR=NUM*100.0/LCNT
C
      DO 134 K=1,8
      GO TO (147,142,142,147,142,142,147,142),K
  147 WRITE(6,38) TODAY
      IF(IS.LE.3) WRITE(6,20) A,H(ILEV),DT1,DT2
      IF(IS.GE.4) WRITE(6,32) A,H(ILEV),H(IS-3)
  142 WRITE (6,3) SC(K)
      WRITE (6,4)
      WRITE (6,7) U(1),ISUMS(1,K)
      DO 133 I=2,10
      WRITE (6,5) U(I),(IDATA(I,J,K),J=1,16),ISUMS(I,K)
  133 CONTINUE
      WRITE (6,7) U(11),ISUMD(18,K)
      WRITE (6,13)
      WRITE (6,6) (ISUMD(J,K),J=1,16),ISUM(K)
      IF(K.EQ.3 .OR. K.EQ.6 .OR. K.EQ.8) WRITE (6,8) CALM
  134 CONTINUE
      WRITE (6,1) NUM,LCNT
      WRITE (6,14) (SC(I),I=1,8),(ISUM(M),M=1,8)
      WRITE (6,15) (U(I),I=1,11),(IWS(L),L=1,10),IWD,
     1 (IWSC(N),N=1,10)
      WRITE(6,38) TODAY
      IF(IS.LE.3) WRITE (6,20) A,H(ILEV),DT1,DT2
      IF(IS.GE.4) WRITE (6,32) A,H(ILEV),H(IS-3)
      WRITE (6,27)
      DO 137 I=1,10
  137 WRITE (6,28) U(I),(IDATA(I,18,K),K=1,7),IVAR(I)
      WRITE (6,30) (ISUMD(18,N),N=1,7),IWD
C
C
```

```
      DO 136 K=1,8
      GO TO (148,144,144,148,144,144,148,144),K
  148 WRITE(6,38) TODAY
      IF(IS.LE.3) WRITE(6,20) A,H(ILEV),DT1,DT2
      IF(IS.GE.4) WRITE(6,32) A,H(ILEV),H(IS-3)
  144 WRITE (6,2) SC(K)
      WRITE (6,4)
      WRITE (6,12) U(1),SUMS(1,K)
      DO 135 I=2,10
      WRITE (6,9) U(I),(DATA(I,J,K),J=1,16),SUMS(I,K)
  135 CONTINUE
      WRITE (6,12) U(11),SUMD(18,K)
      WRITE (6,13)
      WRITE (6,10) (SUMD(J,K),J=1,16),SUM(K)
      IF(K.EQ.3 .OR. K.EQ.6 .OR. K.EQ.8) WRITE (6,8) CALM
  136 CONTINUE
      WRITE(6,35) PCDM
      WRITE (6,16) (SC(I),I=1,8),(SUM(M),M=1,8)
      WRITE (6,17) (U(I),I=1,11),(SWS(L),L=1,10),SWD,
     1 (SWSC(N),N=1,10)
      WRITE(6,38) TODAY
      IF(IS.LE.3) WRITE (6,20) A,H(ILEV),DT1,DT2
      IF(IS.GE.4) WRITE (6,32) A,H(ILEV),H(IS-3)
      WRITE (6,27)
      DO 138 I=1,10
  138 WRITE (6,29) U(I),(DATA(I,18,K),K=1,7),VAR(I)
      WRITE (6,31) (SUMD(18,N),N=1,7),SWD
C
C
      X=2
      IF (IP.NE.1) GO TO 10000
C
C.....
C.....PUNCH JOINT FREQUENCY DATA IN NUMBERS OF HOURS
C.....
      PUNCH 21, A
      IF(IS.LE.3) PUNCH 24, H(ILEV),DT1,DT2
      IF(IS.GE.4) PUNCH 34, H(ILEV),H(IS-3)
      PUNCH 23, NUM
      PUNCH 8, CALM
      PUNCH 18, (ISUMS(1,K),K=1,7)
      DC 161 K=1,7
      DO 160 I=2,10
      PUNCH 19, (IDATA(I,J,K),J=1,16)
  160 CONTINUE
  161 CONTINUE
  888 CONTINUE
C
C.....
C.....FORMAT STATEMENTS
C.....
    1 FORMAT ('0','TOTAL VALID HOURS = ',I6,15X,'TOTAL POSSIBLE',
     1 ' HOURS = ',I6)
    2 FORMAT (' '//' ','JOINT FREQUENCY DISTRIBUTION OF WIND ',
     1 'SPEED AND DIRECTION IN FRACTIONS',10X,
     2 'ATMOSPHERIC STABILITY CLASS ',A4)
    3 FORMAT (' '//' ','JOINT FREQUENCY DISTRIBUTION OF WIND ',
     1 'SPEED AND DIRECTION IN HOURS',10X,
     2 'ATMOSPHERIC STABILITY CLASS ',A4)
    4 FORMAT ('0',1X,'U (M/S)',8X,'N',4X,'NNE',5X,'NE',4X,'ENE',
```

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      1 6X,'E',4X,'ESE',5X,'SE',4X,'SSE',6X,'S',4X,'SSW',5X,'SW',4X,
      2 'WSW',6X,'W',4X,'WNW',5X,'NW',4X,'NNW',2X,'TOTAL'/'+',
      3 1X,'________')
    5 FORMAT (' ',A8,2X,17I7)
    6 FORMAT (' ','TOTAL',5X,17I7)
    7 FORMAT (' ',A8,114X,I7)
    8 FORMAT('0','CALM=',F5.2,' M/S')
    9 FORMAT (' ',A8,2X,17F7.2)
   10 FORMAT (' ','TOTAL',5X,17F7.2)
   12 FORMAT (' ',A8,114X,F7.2)
   13 FORMAT ('+','_________',2X,17(1X,'______'))
   14 FORMAT ('0'/'0','OVERALL STABILITY CLASS FREQUENCIES IN ',
      1 'HOURS'/'0','STABILITY:',4X,7(4X,A4),5X,A4/' ',
      2 'FREQUENCY:',2X,7I8,I10)
   15 FORMAT (' '//' ','OVERALL WIND SPEED FREQUENCIES IN HOURS'/
      1'0','WIND SPEED (M/S):',A8,2X,A8,2(1X,A8),
      2 4(2X,A8),3X,A8,1X,A8,3X,A8/' ','FREQUENCY:',3X,2(2X,I8),
      3 2(1X,I8),4(2X,I8),3X,I8,1X,I8,3X,I8/' ',
      4 'CUMULATIVE FREQ:',I7,2X,I8,
      5 2(1X,I8),4(2X,I8),3X,I8,1X,I8,3X,I8)
   16 FORMAT ('0'/'0','OVERALL STABILITY CLASS FREQUENCIES IN ',
      1 'PERCENT'/'0','STABILITY:',4X,7(4X,A4),5X,A4/' ',
      2 'FREQUENCY:',2X,7F8.1,F10.1)
   17 FORMAT (' '//' ','OVERALL WIND SPEED FREQUENCIES IN PERCENT',
      1 /'0','WIND SPEED (M/S):',A8,2X,A8,2(1X,A8),
      2 4(2X,A8),3X,A8,1X,A8,3X,A8/' ','FREQUENCY:',3X,2(2X,F8.1),
      3 2(1X,F8.1),4(2X,F8.1),3X,F8.1,1X,F8.1,3X,F8.1/' ',
      4 'CUMULATIVE FREQ:',F7.1,2X,F8.1,
      5 2(1X,F8.1),4(2X,F8.1),3X,F8.1,1X,F8.1,3X,F8.1)
   18 FORMAT (7I5)
   19 FORMAT (16I5)
   20 FORMAT ('0',18A4/'0','LEVEL OF WIND DATA: ',F6.1,' METERS',
      1 13X,'DELTA T LAYER: ',F7.1,'-',F5.1,' METERS')
   21 FORMAT(20A4)
   23 FORMAT('TOTAL NUMBER OF HOURS =',I7)
   24 FORMAT('0','LEVEL OF WIND DATA: ',F6.1,'METERS',5X,
      1'DELTA T LAYER: ',F6.1,'-',F5.1,' METERS')
   27 FORMAT('0'//'0','DISTRIBUTION OF VARIABLE WINDS'/'0',
      1 1X,'U (M/S)',
      2 5X,'A',7X,'B',7X,'C',7X,'D',7X,'E',7X,'F',7X,'G',
      3 5X,'TOTAL'/'+',1X,'_______',5X,'_',6(7X,'_'),5X,'_____')
   28 FORMAT(' ',A8,8(1X,I7))
   29 FORMAT(' ',A8,8(1X,F7.2))
   30 FORMAT('+','________',8(3X,'_____')/' ','  TOTAL ',8(1X,I7)
      1 )
   31 FORMAT('+','________',8(3X,'_____')/' ','  TOTAL ',8(1X,F7.2)
      1 )
   32 FORMAT ('0',18A4/'0','LEVEL OF WIND DATA: ',F6.1,' METERS',
      1 13X,'SIGMA THETA LEVEL: ',F6.1,' METERS')
   34 FORMAT('0','LEVEL OF WIND DATA: ',F6.1,'METERS',5X,
      1'SIGMA THETA LEVEL: ',F6.1,' METERS')
   35 FORMAT('0','PERCENT DATA RECOVERY = ',F5.1)
   36 FORMAT('0','STABILITY CLASS BY HOUR OF DAY'/' ',
      1 46X,'HOUR'/' ','YR MN DY    0  1  2  3  4  5  6  7  8 ',
      2 '9 10 11 12 13 14 15 16 17 18 19 20 21 22 23'/' ')
   37 FORMAT(I3,2I3,2X,24(2X,A1))
   38 FORMAT('1','PROGRAM: JFREQ',10X,'VERSION: 3',10X,
      1 'DATED: FEBRUARY 1982',20X,'RUN DATE: ',8A4)
   39 FORMAT('0','STABILITY CLASS BY HOUR OF DAY'/' ',
      1 46X,'HOUR'/' ','YR MN DY    1  2  3  4  5  6  7  8 ',
     2 '9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24'/' ')
C
      GO TO 10000
 1111 STOP
      END
      SUBROUTINE BLNK
C
C.....CHECK FOR BLANK DATA FIELDS
C
      COMMON/DATA2/C(12),WWD(3),WWS(3),STAB(3),SST(3)
      DATA BK/'    '/,Z/9999.9/
      M=9
      N=-2
      DO 10 I=1,3
      N=N+3
      IF(C(N).EQ.BK) WWD(I)=Z
      IF(C(N+1).EQ.BK) WWS(I)=Z
      IF(C(N+2).EQ.BK) SST(I)=Z
   10 IF(C(M+I).EQ.BK) STAB(I)=Z
      RETURN
      END
      SUBROUTINE HEAD1
C
C--------PRINT INPUT INFORMATION
C
      REAL*8 S,T
      COMMON/DATA1/ILEV,IS,IP,LSH,IPS,CALM,VB,IY(2),IM(2),
     1  ID(2),A(18)
      DIMENSION S(6),R(2),T(2)
C
      DATA S/'   UPPER','   INTER','   LOWER','        ',
     1 'MEDIATE ','        '/
      DATA R/'NO  ','YES '/,T/' 00-23  ',' 01-24  '/
C
      WRITE(6,101) A
  101 FORMAT(//'0','TITLE: ',18A4)
      WRITE(6,100) S(ILEV),S(ILEV+3)
  100 FORMAT(//'0','WIND DATA FROM LEVEL:',2A8)
C
      GO TO (20,25,30,35,35,35),IS
   20 WRITE(6,105) S(4),S(1),S(3),S(6)
  105 FORMAT('0','DELTA-T INTERVAL:',2A8,' MINUS',2A8)
      GO TO 50
   25 WRITE(6,105) S(4),S(1),S(2),S(5)
      GO TO 50
   30 WRITE(6,105) S(2),S(5),S(3),S(6)
      GO TO 50
   35 WRITE(6,110) S(IS-3),S(IS)
  110 FORMAT('0','SIGMA THETA LEVEL:',2A8)
C
   50 L=IP+1
      WRITE(6,115) R(L)
  115 FORMAT('0','PUNCH HOURLY JFD ON CARDS: ',A4)
      L=LSH+1
      WRITE(6,120) T(L)
  120 FORMAT('0','HOURLY DATA CODED: ',A8)
      L=IPS+1
      WRITE(6,125) R(L)
  125 FORMAT('0','WRITE STABILITY CLASS BY HOUR OF DAY: ',A4)
      WRITE(6,130) CALM
  130 FORMAT('0','CALM WINDS CODED: ',F6.2,' M/S')
C
      IF(VB.EQ.0.) WRITE(6,135)
      IF(VB.NE.0.) WRITE(6,136) VB
  135 FORMAT('0','NO WINDS CODED AS A VARIABLE DIRECTION')
  136 FORMAT('0','VARIABLE WIND DIRECTION CODED: ',F7.1)
C
      WRITE(6,150)  ((IY(I),IM(I),ID(I)),I=1,2)
  150 FORMAT('0','JPD FOR DATA PERIOD:  BEGINING - ',3I3/' ',
     *          '                         ENDING   - ',3I3)
C
      RETURN
      END
      SUBROUTINE IDAT (ID,IM,IY,JD)
C--------THIS SUBROUTINE CHANGES MONTH AND DAY TO JULIAN DAY
      DIMENSION ID(2),IM(2),IY(2),JD(2),YR(2),IYR(2),MON(12)
      DATA MON/0,31,59,90,120,151,181,212,243,273,304,334/
      DO 20 N=1,2
      IMM=IM(N)
      JD(N)=MON(IMM)
      JD(N)=JD(N)+ID(N)
      YR(N)=IY(N)*0.25
      IYR(N)=YR(N)
      S=YR(N)-IYR(N)
      IF (S.EQ.0.0.AND.JD(N).GT.59) JD(N)=JD(N)+1
   20 CONTINUE
      RETURN
      END
      SUBROUTINE JDAT(IY,JD,IM,ID)
C
C   THIS SUBROUTINE CONVERTS JULIAN DAY TO MONTH AND DAY
C
      DIMENSION MM(12,2)
      DATA MM/0,31,59,90,120,151,181,212,243,273,304,334,
     *        0,31,60,91,121,152,182,213,244,274,305,335/
C
      YR=IY*0.25
      IYR=YR
      S=YR-IYR
      L=1
      IF(S.EQ.0.) L=2
C
      DO 10 I=2,12
      IF(JD.LE.MM(I,L)) GO TO 15
   10 CONTINUE
      I=13
   15 ID=JD-MM(I-1,L)
      IM=I-1
      RETURN
      END
      SUBROUTINE SECTOR(DIR,SP,CALM,VB,JJ)
C--------THIS SUBROUTINE CALCULATES THE SECTOR THE WIND
C--------IS BLOWING FROM.  (COMMON METEOROLOGICAL NOTATION)
C--------THIS SUBROUTINE COURTESY OF JIM SHIELDS
      JJ=17
      IF(SP.LE.CALM) RETURN
      JJ=18
      IF(DIR.EQ.VB) RETURN
      JJ = 1 + ((DIR + 11.25)/22.5)
      IF(JJ.EQ.17) JJ=1
      RETURN
      END
      SUBROUTINE SIGMA(STAB,KK)
C--------THIS SUBROUTINE CALCULATES STABILITY FROM SIGMA THETA
      DIMENSION S(6)
      DATA S/22.5,17.5,12.5,7.5,3.8,2.1/
      DO 100 KK=1,6
  100 IF(STAB.GE.S(KK)) RETURN
      KK=7
      RETURN
      END
      SUBROUTINE SPEED(SP,CALM,II)
      DIMENSION S(9)
      DATA S/0.,.5,.75,1.,1.5,2.,3.,5.,10./
      S(1)=CALM
      DO 10 II=1,9
   10 IF(SP.LE.S(II)) RETURN
      II=10
      RETURN
      END
      SUBROUTINE STABLE(STAB,KK)
      DIMENSION S(6)
C--------THIS SUBROUTINE CALCULATES STABILITY CLASS
C--------KK=1,2,3...CORRESPONDS TO STABILITY CLASSES A,B,C...
      DATA S/-1.9,-1.7,-1.5,-0.5,1.5,4.0/
      DO 100 KK = 1,6
  100 IF(STAB.LE.S(KK)) RETURN
      KK = 7
      RETURN
      END
//STEP3 EXEC EDSIN,NAME='#DC1#SZ.TEST.DATA1',
//  DISK=FILE33,LRECL=160,BLKSIZE=3200
//STEP4 EXEC FORGLKGO
//GO.FT01F001 DD DSN=&INPUT,DISP=(OLD,KEEP)
//GO.FT05F001  DD  *
TEST RUN #1
33011 0.25 8888.8
800101 811231
/*
```

APPENDIX D

PROGRAM LISTING OF MISS

```
C
C   ****************************************************************
C   *                                                              *
C   *                           MISS                               *
C   *                                                              *
C   *       THIS PROGRAM CALCULATES PERIODS OF OCCURENCE OF        *
C   *                       MISSING DATA                           *
C   *                                                              *
C   * PROGRAMMER: WILLIAM SNELL                                    *
C   * DATE: JUNE 1978                                              *
C   * VERSION: 1                                                   *
C   *                                                              *
C   * MODIFIED: W. SNELL                                           *
C   * DATE: FEBRUARY 1982                                          *
C   * VERSION: 2                                                   *
C   *                                                              *
C   ****************************************************************
C
      REAL*8 HR
      COMMON/DATA1/D1(16),C(16)
      DIMENSION TODAY(8),A(200),H(3),D2(16),IC(16),BDN(16),BDX(16),
     1 ICHK(13,16),ITOT(16),TITLE(18),HR(13),ICT(16),ICTT(16),P(16)
      DATA HR/'    1   ','    2   ','    3   ','    4   ',
     1        '    5   ','    6   ','  7-11  ','  12-23 ',
     2        '  24-47 ','  48-71 ','  72-95 ','  96-119',
     3        '   >120 '/
      DATA BDN/0.,0.,-99.9,-99.9,0.,0.,-99.9,-99.9,0.,0.,-99.9,
     1 -99.9,-7.,-7.,-7.,0./
      DATA BDX/365.,99.9,99.9,100.,365.,99.9,99.9,100.,365.,99.9,
     1 99.9,100.,35.,35.,35.,254./
      DATA IC,ICT,ITOT/48*0/,ICTT/16*0/,ICHK/208*0/,D2/16*0./
C
      CALL RHB240 (TODAY)
C
C     READ AND WRITE OUT HEADING OF DATA FILE
C
      PRINT 200, TODAY
      READ(1,10) A
   10 FORMAT(4(40A4/),40A4)
      PRINT 11, A
   11 FORMAT('-','SITE:'/'0',10(' ',20A4/))
C
C     READ INPUT CARDS
C
      READ(5,12) TITLE,JY,JM,JD,KY,KM,KD
   12 FORMAT(18A4/3I2,1X,3I2)
      CALL IDAT(JD,JM,JY,JJD)
      CALL IDAT(KD,KM,KY,JKD)
      ISTRT=JY*1000+JJD
      IEND=KY*1000+JKD
      PRINT 203, TITLE,JY,JM,JD,KY,KM,KD
C
C     READ DATA AND CATEGORIZE BY MISSING PERIOD
C
   75 READ(1,102,END=999) IY,ID,H(1),(D1(I),I=1,4),H(2),
     * (D1(I),I=5,8),H(3),(D1(I),I=9,16),(C(I),I=1,16)
  102 FORMAT(6X,I2,I3,4X,3(3F5.1,5X,2F5.1,5X),4F5.1,
     1 T16,3(6X,A4,1X,A4,6X,A4,1X,A4,5X),4(1X,A4))
      IDATE=IY*1000+ID
      IF(IDATE.LT.ISTRT) GO TO 75
      IF(IDATE.GT.IEND)  GO TO 999
      CALL BLNK
C
C     SUMMARIZE DATA
C
      DO 15 N=1,9,4
   15 IF(D1(N).EQ.7777.7) D1(N)=0.0
C
      DO 50 N=1,16
      ICTT(N)=ICTT(N)+1
      IF(D1(N).LT.BDN(N) .OR. D1(N).GT.BDX(N)) GO TO 25
      IF(D2(N).LT.BDN(N) .OR. D2(N).GT.BDX(N)) GO TO 30
      GO TO 50
   25 IC(N)=IC(N)+1
      GO TO 50
   30 CALL CHK(IC(N),M)
      IF(IC(N).GT.ITOT(N)) ITOT(N)=IC(N)
      ICHK(M,N)=ICHK(M,N)+1
      ICT(N)=ICT(N)+IC(N)
      IC(N)=0
   50 CONTINUE
C
      DO 60 N=1,16
   60 D2(N)=D1(N)
C
      GO TO 75
C
  999 CONTINUE
C
      DO 65 N=1,16
      IF(D1(N).GE.BDN(N) .AND. D1(N).LE.BDX(N)) GO TO 65
      CALL CHK(IC(N),M)
      IF(IC(N).GT.ITOT(N)) ITOT(N)=IC(N)
      ICHK(M,N)=ICHK(M,N)+1
      ICT(N)=ICT(N)+IC(N)
   65 CONTINUE
C
      DO 66 N=1,16
   66 P(N)=(ICTT(N)-ICT(N))*100./ICTT(N)
C
C     PRINT OUT RESULTS
C
      PRINT 200, TODAY
      PRINT 201, TITLE
      PRINT 207, (H(N),N=1,3),H(1),H(1),H(2),H(3),H(2),H(3)
      DO 150 M=1,13
  150 PRINT 202, HR(M), (ICHK(M,N),N=1,16)
      PRINT 204, (ITOT(N),N=1,16)
      PRINT 205, (ICT(N),N=1,16)
      PRINT 206, (ICTT(N),N=1,16)
      PRINT 208, (P(N),N=1,16)
C
C     FORMAT STATEMENTS
C
  200 FORMAT('1','PROGRAM: MISS',10X,'VERSION: 2',10X,
     1 'DATED: FEBRUARY 1982',20X,'RUN DATE: ',8A4)
  201 FORMAT('0',18A4/'0','HOURLY SUMMARY OF MISSING DATA')
  202 FORMAT('0',A8,4X,12I7,1X,3I7,1X,I7)
  203 FORMAT(/////'0','INPUT OPTIONS:'/'0','TITLE:  ',
     1 18A4/'0','STARTING DATE:',3I3/' ',
     2 'ENDING DATE:  ',3I3)
  204 FORMAT('0','LONGEST CASE',12I7,1X,3I7,1X,I7)
  205 FORMAT('0','TOTAL HOURS'/' ','  MISSING',3X,12I7,1X,3I7,1X,I7)
  206 FORMAT('0','TOTAL HOURS',1X,12I7,1X,3I7,1X,I7)
  207 FORMAT('0',6X,3(15X,F6.1,' METERS'),9X,'TEMPERATURE',
     1 ' DIFFERENCE'/' ',13X,3(2X,26('-')),2X,22('-')/' ',
     2 ' PERIOD OF',
     3 2X,3(2(3X,'WIND'),11X,'DEW'),3X,'(DEGREES C/100METERS)'/' ',
     4 ' OCCURENCE',
     5 3X,3(3X,'DIR',3X,'SPEED',2X,'TEMP',3X,'POINT'),1X,
     6 3(F6.1,'-'),3X,'PRECIP'/' ','  (HOURS) '  ',
     7 3(2X,'(DEG)',2X,'(M/S)',3X,'(C)',4X,'(C)',1X),
     8 2X,3(F6.1,1X),3X,'(MM)'/' ','  -------    ',
     9 12(2X,'-----'),1X,3(2X,'-----'),3X,'-----')
  208 FORMAT('0','PERCENT DATA'/' ','  RECOVERY  ',
     1 12F7.1,1X,3F7.1,1X,F7.1)
      STOP
      END
      SUBROUTINE BLNK
C
C.....CHECK FOR BLANK DATA FIELDS AND REPLACE AS MISSING
C
      COMMON/DATA1/D1(16),C(16)
      DATA BK/'    '/
C
      DO 10 I=1,16
   10 IF(C(I).EQ.BK) D1(I)=9999.9
      RETURN
      END
      SUBROUTINE CHK(IC,M)
C
C.....CATEGORIZIES OCCURENCE INTERVALS
C
      DIMENSION N(12)
      DATA N/1,2,3,4,5,6,11,23,47,71,95,119/
      DO 10 M=1,12
   10 IF(IC.LE.N(M)) RETURN
      M=13
      RETURN
      END
      SUBROUTINE IDAT (ID,IM,IY,JD)
C
C.....THIS SUBROUTINE CHANGES MONTH AND DAY TO JULIAN DAY
C
      DIMENSION MON(12)
      DATA MON/0,31,59,90,120,151,181,212,243,273,304,334/
      JD=MON(IM)
      JD=JD+ID
      YR=IY*0.25
      IYR=YR
      S=YR-IYR
      IF (S.EQ.0.0.AND.JD.GT.59) JD=JD+1
      RETURN
      END
```

APPENDIX E

PROGRAM LISTING OF PRECP

```
C
C ***********************************************************************
C *                                                                     *
C *                               PRECP                                 *
C *                                                                     *
C *          THIS PROGRAM CATEGORIZES PRECIPITATION DATA BY             *
C *            INTENSITY, STABILITY CLASS, MONTH AND DAY                *
C *                                                                     *
C * PROGRAMMER: JAMES HAWXHURST                                         *
C * VERSION: 1                                                          *
C * DATED: APRIL 1981                                                   *
C *                                                                     *
C * REVISED: WILLIAM SNELL                                              *
C * VERSION: 2                                                          *
C * DATED: FEBRUARY 1982                                                *
C *                                                                     *
C ***********************************************************************
C
      REAL*8 PPT(17)
      COMMON/DATA1/D(4),C(4)
      DIMENSION TODAY(8),A(200),TITLE(18),S(8),JPC(8,17),JPM(12),
     1 IPM(12,17),MONTH(12),PM(12),IPS(8),IPC(17),PRCT(17),CUM(17),
     2 PR(12),PC(8),PP(12,31),H(3),JPS(8),PJ(8)
C
C  INITIALIZE VARIABLES
C
      DATA S /'  A ','  B ','  C ','  D ','  E ','  F ',
     1 '  G ','MISS'/
      DATA PPT /'     0.0',
     1 '>0.0-.25','>.25-.50','>.50-.75','>.75-1.0',
     2 '>1.0-2.0','>2.0-3.0','>3.0-4.0','>4.0-5.0',
     3 '>5.0-7.5','>7.5-10.','>10.-15.','>15.-20.',
     4 '>20.-25.','>25.-30.','>30.-40.','>40.    '/
      DATA PP/372*0./,PR,PC,PJ,PT,PM,PRCT,CUM/75*0./
      DATA IICT,ICT/2*0/,JPM,IPS,JPS,IPM,IPC,JPC/385*0/
      DATA MONTH/'JAN','FEB','MAR','APR','MAY','JUN','JUL','AUG',
     1 'SEP','OCT','NOV','DEC'/
C
      CALL RHB240 (TODAY)
C
      PRINT 205, TODAY
  205 FORMAT('1','PROGRAM: PRECP',10X,'VERSION: 2',10X,
     * 'DATED: FEBRUARY 1982',20X,'RUN DATE: ',8A4)
C
C  READ AND WRITE TITLE FROM DATA FILE
C
      READ(1,11) A
      PRINT 12, A
   11 FORMAT(4(40A4/),40A4)
   12 FORMAT ('0','SITE:'/' ',20A4/9(' ',20A4/)////)
C
C   READ INPUT CARDS
C
C   TITLE = TITLE TO BE PRINTED ON EACH PAGE
C   IS = INTERVAL FOR DETERMINATION OF STABILITY
C        BASED ON DELTA-T
C        IS=1 : UPPER - LOWER
C        IS=2 : UPPER - INTERMEDIATE
C        IS=3 : INTERMEDIATE - LOWER
C   LY1,LM1,LD1 = STARTING YEAR, MONTH AND DAY
```

```
C     LY2,LM2,LD2 = ENDING YEAR, MONTH AND DAY
C
      READ(5,13) TITLE,IS,LY1,LM1,LD1,LY2,LM2,LD2
   13 FORMAT(18A4/I1,1X,3I2,1X,3I2)
      PRINT 14, TITLE,LY1,LM1,LD1,LY2,LM2,LD2
   14 FORMAT('0','TITLE: ',18A4/'0','START DATE: ',
     * 3I3/' ','END   DATE: ',3I3////)
      CALL IDAT(LD1,LM1,LY1,JD1)
      CALL IDAT(LD2,LM2,LY2,JD2)
      ISTRT=LY1*1000+JD1
      IEND=LY2*1000+JD2
C
C     READ DATA FROM TAPE - NBC FORMAT
C
   35 READ(1,100,END=999) IY,ID,(H(I),I=1,3),
     1 (D(N),N=1,4),(C(N),N=1,4)
  100 FORMAT(6X,I2,I3,4X,3(F5.1,30X),4F5.1,T121,4(1X,A4))
      IDATE=IY*1000+ID
      IF(IDATE.LT.ISTRT) GO TO 35
      IF(IDATE.GT.IEND) GO TO 999
      CALL BLNK
      IICT=IICT+1
      IF(D(4).LT.0. .OR. D(4).GT.254.) GO TO 35
C
      ICT=ICT+1
      IF(D(4).GT.0.) JCT=JCT+1
      CALL JPRECP(D(4),II)
      CALL JDAT(IY,ID,MM,MD)
      CALL STABLE(D(IS),IC)
C
      PP(MM,MD)=PP(MM,MD)+D(4)
      JPC(IC,II)=JPC(IC,II)+1
      IPM(MM,II)=IPM(MM,II)+1
      PM(MM)=PM(MM)+D(4)
      IPS(IC)=IPS(IC)+1
      IF(D(4).GT.0.) JPS(IC)=JPS(IC)+1
      JPM(MM)=JPM(MM)+1
      IPC(II)=IPC(II)+1
      PT=PT+D(4)
C
      GO TO 35
C
  999 CONTINUE
C
      DO 40 I=1,8
      PJ(I)=JPS(I)*100./JCT
   40 PC(I)=IPS(I)*100./ICT
C
      DO 45 I=1,12
   45 PR(I)=JPM(I)*100./ICT
C
      DO 50 I=1,17
      PRCT(I)=IPC(I)*100./ICT
      DO 50 J=1,I
   50 CUM(I)=CUM(I)+PRCT(J)
C
C
      P=ICT*100./IICT
      PJJ=JCT*100./ICT
      PRINT 275, ICT,IICT,P
  275 FORMAT(//////'0','HOURS VALID PRECIPITATION:',I6/' ',
     1                 'TOTAL HOURS EXAMINED:     ',I6/' ',
     2                 'PERCENT DATA RECOVERY:    ',F6.1)
      L1=1
      L2=3
      IF(IS.EQ.3) L1=2
      IF(IS.EQ.2) L2=2
C
      PRINT 205, TODAY
      PRINT 250, TITLE
      PRINT 201
      PRINT 210, (MONTH(I),I=1,12)
      DO 300 N=1,31
  300 PRINT 215, N,(PP(I,N),I=1,12)
      PRINT 220, (PM(I),I=1,12),PT
C
      PRINT 205, TODAY
      PRINT 250, TITLE
      PRINT 202
      PRINT 211, (MONTH(I),I=1,12)
      DO 301 N=1,17
  301 PRINT 216, PPT(N),(IPM(I,N),I=1,12)
      PRINT 221, (JPM(I),I=1,12),(PR(I),I=1,12)
C
      PRINT 205, TODAY
      PRINT 250, TITLE
      PRINT 200, H(L1),H(L2)
      PRINT 203
      PRINT 212, (S(I),I=1,8)
      DO 302 N=1,17
  302 PRINT 217, PPT(N),(JPC(I,N),I=1,8),IPC(N),PRCT(N),CUM(N)
      PRINT 222, (JPS(I),I=1,8),JCT,PJJ,(PJ(I),I=1,8)
      PRINT 223, (IPS(I),I=1,8),ICT,(PC(I),I=1,8)
C
  200 FORMAT('0','DELTA-T INTERVAL: ',F6.1,
     * '-',F6.1,' METERS')
  201 FORMAT(/'0',T29,'PRECIPITATION SUMMARIZED BY MONTH AND DAY',
     1 ' IN MILLIMETERS')
  202 FORMAT(/'0',T28,'PRECIPITATION OCCURRENCES SUMMARIZED BY',
     1 ' MONTH AND INTENSITY IN HOURS')
  203 FORMAT(/'0',T20,'PRECIPITATION OCCURRENCES SUMMARIZED BY',
     1 ' STABILITY AND INTENSITY IN HOURS')
  210 FORMAT('0',T55,'MONTH'/' ','  DAY',12(5X,A3)/)
  211 FORMAT('0',T59,'MONTH'/' ','INTENSITY',12(5X,A3)/' ','  (MM)'/)
  212 FORMAT('0',T38,'STABILITY CLASS',T109,'CUMULATIVE'/' ',
     1 'INTENSITY',8(5X,A4),5X,'TOTAL',2(5X,'PERCENT')/' ','  (MM)'/)
  215 FORMAT(' ',I4,1X,12F8.1)
  216 FORMAT(' ',1X,A8,12I8)
  217 FORMAT(' ',1X,A8,9I9,4X,F8.2,4X,F8.1)
  220 FORMAT('0','TOTAL',12F8.1,5X,'TOTAL=',F8.1,' MM')
  221 FORMAT('0','TOTAL HRS',12I8,/'0',' PERCENT ',12F8.1)
  222 FORMAT(/'0','HRS WITH '/' ',' PRECIP  ',9I9,4X,F8.2/'0',
     * ' PERCENT ',8F9.2)
  223 FORMAT(//'0','TOTAL HRS',9I9/'0',' PERCENT ',8F9.1)
  250 FORMAT('0',18A4)
C
      STOP
      END
      SUBROUTINE BLNK
C
```

```
C   CHECK FOR BLANK DATA FIELDS AND CONVERT TO MISSING
C
      COMMON/DATA1/D(4),C(4)
      DATA BLK/'    '/
C
      DO 10 N=1,4
   10 IF(C(N).EQ.BLK) D(N)=9999.9
      RETURN
      END
      SUBROUTINE IDAT(ID,IM,IY,JD)
C
C.....THIS SUBROUTINE CHANGES MONTH AND DAY TO JULIAN DAY
C
      DIMENSION MON(12)
      DATA MON/0,31,59,90,120,151,181,212,243,273,304,334/
      JD=MON(IM)
      JD=JD+ID
      YR=IY*0.25
      IYR=YR
      S=YR-IYR
      IF (S.EQ.0. .AND. JD.GT.59) JD=JD+1
      RETURN
      END
      SUBROUTINE JDAT(IY,JD,IM,ID)
C
C   THIS SUBROUTINE CONVERTS JULIAN DAY TO MONTH AND DAY
C
      DIMENSION MM(12,2)
      DATA MM/0,31,59,90,120,151,181,212,243,273,304,334,
     *        0,31,60,91,121,152,182,213,244,274,305,335/
C
      YR=IY*0.25
      IYR=YR
      S=YR-IYR
      L=1
      IF(S.EQ.0.) L=2
C
      DO 10 I=2,12
      IF(JD.LE.MM(I,L)) GO TO 15
   10 CONTINUE
      I=13
   15 ID=JD-MM(I-1,L)
      IM=I-1
      RETURN
      END
      SUBROUTINE JPRECP(P,I)
C
C ****   THIS SUBROUTINE CATEGORIZES PRECIPITATION
C
      DIMENSION AMT(16)
      DATA AMT/0.,.25,.5,.75,1.,2.,3.,4.,5.,7.5,10.,15.,
     * 20.,25.,30.,40./
      DO 10 I=1,16
   10 IF(P.LE.AMT(I)) RETURN
      I=17
      RETURN
      END
      SUBROUTINE STABLE(S,K)
C
C  *** CALCULATE STABILITY CLASS A - G BASED ON DELT-T
```

```
C
      DIMENSION CL(6)
      DATA CL/-1.9,-1.7,-1.5,-0.5,1.5,4.0/
      K=8
      IF(S.LT.-7. .OR. S.GT.35.) RETURN
      DO 10 K=1,6
   10 IF(S.LE.CL(K)) RETURN
      K=7
      RETURN
      END
```

APPENDIX F

PROGRAM LISTING OF PRINT

```
C
C  **************************************************************
C  *                                                            *
C  *                         PRINT                              *
C  *                                                            *
C  *        THIS PROGRAM PRINTS HOURLY DATA FROM A DATA         *
C  *        SET IN THE NRC FORMAT, DATA PRINTED IS WIND         *
C  *        SPEED, WIND DIRECTION, SIGMA THETA, TEMPERATURE,    *
C  *        DEW POINT, DELTA-T AND PRECIPITATION.               *
C  *                                                            *
C  * PROGRAMMER: WILLIAM SNELL                                  *
C  * DATE: JUNE 1978                                            *
C  * VERSION: 1                                                 *
C  *                                                            *
C  * MODIFIED: W. SNELL                                         *
C  * DATE: MARCH 1982                                           *
C  * VERSION: 2                                                 *
C  *                                                            *
C  **************************************************************
C
      DIMENSION TODAY(8),B(8),A(200),TITLE(18)
      COMMON IW(3),CW(3),D(16),C(16)
      DATA B/'A','B','C','D','E','F','G','-'/
      DATA ICK/52/
C
      CALL RHB240 (TODAY)
      PRINT 11, TODAY
   11 FORMAT('1','PROGRAM: PRINT',10X,'DATED: MARCH 1982',
     * 10X,'VERSION: 2',15X,'RUN DATE: ',8A4)
C
      READ(1,12) A
      PRINT 13, A
   12 FORMAT(4(40A4/),40A4)
   13 FORMAT(///'0','SITE: '/' ',10(' ',20A4/))
C
      READ(5,14) TITLE,IS,IE
   14 FORMAT(18A4/I6,1X,I6)
      PRINT 16, TITLE,IS,IE
   16 FORMAT(///'0','TITLE: ',18A4///'0',
     1 'DATES SPECIFIED TO BE PRINTED:'/' ',
     2 5X,'START DATE: ',I6/' ',5X,'END   DATE: ',I6)
C
      GO TO 25
   15 ICK=0
      PRINT 11, TODAY
      PRINT 200, TITLE,H1,H2,H3,H1,H1,H2,H3,H2,H3
      GO TO 50
C
C
   25 READ(1,100,END=998) IY,JD,IH,H1,IW(1),(D(N),N=1,4),H2,IW(2),
     1 (D(N),N=5,8),H3,IW(3),(D(N),N=9,16),CW(1),(C(N),N=1,4),
     2 CW(2),(C(N),N=5,8),CW(3),(C(N),N=9,16)
      CALL JDAT(IY,JD,IM,ID)
      IDATE=IY*10000+IM*100+ID
      IF(IDATE.LT.IS) GO TO 25
      IF(IDATE.GT.IE) GO TO 998
C
   50 ICK=ICK+1
      IF(ICK.EQ.53) GO TO 15
      IH=IH/100
      CALL BLNK
      CALL SIGMA(D(2),J4)
      CALL SIGMA(D(6),J5)
      CALL SIGMA(D(10),J6)
      CALL STABLE(D(13),J1)
      CALL STABLE(D(14),J2)
      CALL STABLE(D(15),J3)
C
      PRINT 201, IY,IM,ID,IH,IW(1),D(1),D(2),B(J4),D(3),D(4),IW(2),
     1 D(5),D(6),B(J5),D(7),D(8),IW(3),D(9),D(10),B(J6),D(11),D(12),
     1 D(13),B(J1),D(14),B(J2),D(15),B(J3),D(16)
      GO TO 25
C
  100 FORMAT(6X,I2,I3,I4,3(F5.1,I5,4F5.1,5X),4F5.1,T16,
     1 3(5X,5(1X,A4),5X),4(1X,A4))
  200 FORMAT('0',18A4/'0',T104,'TEMPERATURE DIFFERENCE',/' ',3X,
     1 3(16X,F6.1,' METERS'),T105,'(DEGREES C/100METERS)'/'+',
     2 13X,3(28('-'),2X),T104,23('-')/' ',
     3 12X,3('  WD   WS   SIGMA  TEMP DEWPT '),
     4 3(F6.1,'- '),'PRECIP'/' ','YR MN DY HR',
     5 3(' (DEG)(M/S)  (DEG)   (C)  (C) '),1X
     6 3(F7.1,1X),' (MM)'/'+',4('-- '),
     7 3(' --- ----  ------ ----- ----- '),3('------- '),'------')
  201 FORMAT(' ',I2,3I3,3(1X,I4,F5.1,F6.1,1X,A1,2F6.1),
     1 3(F6.1,1X,A1),F7.1)
C
  998 STOP
      END
      SUBROUTINE BLNK
C
C...CHECK FOR BLANK DATA FIELDS AND CONVERT TO -99.9 OR -99
C...CHANGE CODES FOR MISSING TO 99.9, 999.9 OR 999
C
      COMMON IW(3),CW(3),D(16),C(19)
      DATA BK/'    '/
      DO 20 I=1,16
      GO TO (7,5,5,5,7,5,5,5,7,5,5,5,7,7,7,5),I
    5 IF(D(I).EQ.9999.9) D(I)=999.9
      GO TO 10
    7 IF(D(I).EQ.9999.9) D(I)=99.9
   10 IF(C(I).EQ.BK) D(I)=-99.9
   20 CONTINUE
      DO 15 I=1,3
      IW(I)=IW(I)*.1
      IF(IW(I).EQ.9999) IW(I)=999
   15 IF(CW(I).EQ.BK) IW(I)=-99
      RETURN
      END
      SUBROUTINE JDAT(IY,JD,IM,ID)
C
C   THIS SUBROUTINE CONVERTS JULIAN DAY TO MONTH AND DAY
C
      DIMENSION MM(12,2)
      DATA MM/0,31,59,90,120,151,181,212,243,273,304,334,
     *         0,31,60,91,121,152,182,213,244,274,305,335/
C
      YR=IY*0.25
      IYR=YR
      S=YR-IYR
      L=1
      IF(S.EQ.0.) L=2
C
      DO 10 I=2,12
      IF(JD.LE.MM(I,L)) GO TO 15
   10 CONTINUE
      I=13
   15 ID=JD-MM(I-1,L)
      IM=I-1
      RETURN
      END
      SUBROUTINE SIGMA(SIG,K)
C
C...THIS ROUTINE CALCULATES STABILITY FROM SIGMA THETA
C
      DIMENSION S(6)
      DATA S/22.5,17.5,12.5,7.5,3.8,2.1/
      K=8
      IF(SIG.EQ.-99.9 .OR. SIG.EQ.999.9) RETURN
      DO 10 K=1,6
   10 IF(SIG.GE.S(K)) RETURN
      K=7
      RETURN
      END
      SUBROUTINE STABLE(DT,IS)
C
C...CALCULATE STABILITY CLASS BASED ON DEGREES C PER 100METERS
C
      DIMENSION S(6)
      DATA S/-1.9,-1.7,-1.5,-0.5,1.5,4.0/
      IS=8
      IF(DT.EQ.99.9 .OR. DT.EQ.-99.9) RETURN
      DO 10 IS=1,6
      IF(DT.LE.S(IS)) RETURN
   10 CONTINUE
      IS=7
      RETURN
      END
```

APPENDIX G

PROGRAM LISTING OF QA

```
C
C     ***************************************************************
C     *                                                             *
C     *                            QA                               *
C     *                                                             *
C     *   THIS IS A QUALITY ASSURANCE PROGRAM FOR METEOROLOGICAL     *
C     *   DATA ON MAGNETIC TAPE IN THE NRC FORMAT. PROGRAM QA       *
C     *   CAN HANDLE DATA FROM ALL THREE LEVELS SIMULTANEOUSLY.     *
C     *   THE VARIABLES CHECKED ARE WIND SPEED, WIND DIRECTION,     *
C     *   DELTA T, TEMPERATURE, DEW POINT AND PRECIPITATION.        *
C     *                                                             *
C     * PROGRAMMER: WILLIAM SNELL                                   *
C     * DATE: APRIL 1978                                            *
C     * VERSION:1                                                   *
C     *                                                             *
C     * MODIFIED: W. SNELL                                          *
C     * DATE: FEBRUARY 1982                                         *
C     * VERSION: 2                                                  *
C     *                                                             *
C     ***************************************************************
C
      COMMON/DATA1/LEV,IS,EL1,EL2,EL3,ICHK,NS(18),IP,ID
      COMMON/DATA2/IY1,IY2,ID1,ID2,IH1,IH2
      COMMON/DATA3/WS1(3),WS2(3),WD1(3),WD2(3),T1(3),T2(3),
     * DT1(3),DT2(3),P1,P2,D1(3)
      COMMON/DATA4/KX(3),JJ(3),KP,KT(6),JA,JB,JC
      COMMON/DATA5/IPAGE,INC,TITLE
      COMMON/DATA6/C(16)
      COMMON/DATA7/LY1,LM1,LD1,LY2,LM2,LD2
      COMMON/DATA8/TODAY(8)
C
      DIMENSION AB(200),TITLE(18)
      DIMENSION WDMN(3),WDMX(3),WSMN(3),WSMX(3),TMN(3),TMX(3),
     1 DMN(3),DMX(3),DTMN(3),DTMX(3),NWD(3),NWS(3),NT(3),ND(3),
     2 NDT(3)
C
C     INITIALIZE
C
      DATA WDMN,WSMN,TMN,DMN,DTMN,PMN/16*999.9/
      DATA WDMX,WSMX,TMX,DMX,DTMX,PMX/16*-99.9/
      DATA NWD,NWS,NT,ND,NDT,NP/16*0/
C
      CALL PHB240 (TODAY)
C
      DO 12 I=1,3
      KX(I)=1
      KT(I)=1
   12 KT(I+3)=0
      DO 13 I=1,18
   13 NS(I)=0
      KP=1
      JA=1
      JB=1
      JC=1
      INC=59
      ICHK=0
      IPAGE=1
C
C     READ INPUT CARD
C
```

```
C     LEV...LEVEL OF MEASUREMENTS DESIRED:
C                   UPPER (U) ONLY , LEV=1
C                   UPPER (U) + LOWER (L) , LEV=2
C                   UPPER (U), INTERMEDIATE (I) + LOWER (L) , LEV=3
C                   LOWER (L), ONLY , LEV=4
C     IS....DELTA T FOR LEVELS DESIRED:  U-L,IS=1 : U-I,IS=2 :
C                                        I-L,IS=3 : U-L,U-I,IS=4 :
C                                        U-L,I-L,IS=5 : U-I,I-L,IS=6 :
C                                        I-L,U-I,U-L,IS=7
C        IF NO STABILITY MEASEUREMENTS ARE DESIRED, IS=0
C     IW....TO CHECK WIND SPEED + DIRECTION, IW=1   (IF NOT, IW=0)
C     IT....TO CHECK TEMPERATURE, IT=1   (IF NOT, IT=0)
C     ID....TO CHECK DEW POINT WITH TEMPERATURE, ID=1   (IF NOT, ID=0)
C     IP....TO CHECK PRECIPITATION, IP=1   (IF NOT, IP=0)
C
C     LY1.... YEAR CHECKING IS TO BEGIN
C     LM1.... MONTH CHECKING IS TO BEGIN
C     ID1.... DAY CHECKING IS TO BEGIN
C     LY2.... YEAR CHECKING IS TO END
C     LM2.... MONTH CHECKING IS TO END
C     LD2.... DAY CHECKING IS TO END
C
      READ(5,15) LEV,IS,IW,IT,ID,IP,LY1,LM1,LD1,LY2,LM2,LD2,TITLE
   15 FORMAT(6I1,2(1X,3I2)/19A4)
      CALL HEAD1(INC,TITLE,IPAGE)
      CALL HEAD2(LEV,IS,IW,IT,ID,IP)
      INC=58
      IF(ID.EQ.1) IT=1
C
      CALL IDAT(LD1,LM1,LY1,LD3)
      CALL IDAT(LD2,LM2,LY2,LD4)
      ISTRT=LY1*1000+LD3
      ISTOP=LY2*1000+LD4
C
C     READ AND WRITE TITLE FROM DATA FILE
C
      READ(1,35) AB
      PRINT 36, AB
   35 FORMAT(4(40A4/),40A4)
   36 FORMAT('0',20A4/9(' ',20A4/))
      CALL HEAD1(INC,TITLE,IPAGE)
C
C     READ DATA FROM DATA FILE AND MAKE APPROPRIATE CHECKS
C
  101 CONTINUE
      READ(1,41,END=103) IY1,ID1,IH1,EL1,WD1(1),WS1(1),T1(1),D1(1),
     1EL2,WD1(2),WS1(2),T1(2),D1(2),EL3,WD1(3),WS1(3),T1(3),D1(3),
     2 (DT1(I),I=1,3),P1,(C(I),I=1,16)
   41 FORMAT(6X,I2,I3,I4,3(3F5.1,5X,2F5.1,5X),4F5.1,
     * T16,3(6X,A4,1X,A4,6X,A4,1X,A4,5X),4(1X,A4))
      IDATE=IY1*1000+ID1
      IF(IDATE.LT.ISTRT) GO TO 101
      IF(IDATE.GT.ISTOP) GO TO 103
C
      CALL BLNK
C
C.....DETERMINE MAXIMUM AND MINIMUM OF EACH VALUE
C
      DO 48 N=1,3
      IF(WD1(N).GT.365. .OR. WD1(N).LT.0.) GO TO 43
      IF(WD1(N).LT.WDMN(N)) WDMN(N)=WD1(N)
      IF(WD1(N).GT.WDMX(N)) WDMX(N)=WD1(N)
      NWD(N)=NWD(N)+1
   43 IF(WS1(N).GT.99.9 .OR. WS1(N).LT.0.) GO TO 44
      IF(WS1(N).LT.WSMN(N)) WSMN(N)=WS1(N)
      IF(WS1(N).GT.WSMX(N)) WSMX(N)=WS1(N)
      NWS(N)=NWS(N)+1
   44 IF(T1(N).GT.99.9 .OR. T1(N).LT.-99.9) GO TO 45
      IF(T1(N).LT.TMN(N)) TMN(N)=T1(N)
      IF(T1(N).GT.TMX(N)) TMX(N)=T1(N)
      NT(N)=NT(N)+1
   45 IF(D1(N).GT.100. .OR. D1(N).LT.-99.9) GO TO 46
      IF(D1(N).LT.DMN(N)) DMN(N)=D1(N)
      IF(D1(N).GT.DMX(N)) DMX(N)=D1(N)
      ND(N)=ND(N)+1
   46 IF(DT1(N).GT.35.0 .OR. DT1(N).LT.-7.0) GO TO 48
      IF(DT1(N).LT.DTMN(N)) DTMN(N)=DT1(N)
      IF(DT1(N).GT.DTMX(N)) DTMX(N)=DT1(N)
      NDT(N)=NDT(N)+1
   48 CONTINUE
      IF(P1.GT.254. .OR. P1.LT.0.) GO TO 49
      IF(P1.LT.PMN) PMN=P1
      IF(P1.GT.PMX) PMX=P1
      NP=NP+1
   49 CONTINUE
C
      IF(IW.EQ.1) CALL WSWDQ
      IF(IT.EQ.1) CALL TEMPQ
      IF(IP.EQ.1) CALL PCPQ
      IF(IS.NE.0) CALL STABQ1
      IF(IS.NE.0) CALL STABQ2
C
C     REINITIALIZE VARIABLES
C
      ICHK=1
      IY2=IY1
      ID2=ID1
      IH2=IH1
      DO 50 N=1,3
      WS2(N)=WS1(N)
      WD2(N)=WD1(N)
      DT2(N)=DT1(N)
      T2(N)=T1(N)
      CALL SECTOR(WD2(N),JJ(N))
   50 CONTINUE
      P2=P1
      GO TO 101
C
C     CHECK LAST DATA RECORD AND PRINT RESULTS
C
  103 ICHK=3
      IF(IS.NE.0) CALL STABQ2
      IF(IT.EQ.1) CALL TEMPQ
      IF(IP.EQ.1) CALL PCPQ
      IF(IW.EQ.1) CALL WSWDQ
      IF(IW.NE.1) GO TO 75
      INC=59
      CALL HEAD1(INC,TITLE,IPAGE)
      CALL HEAD3
   75 INC=59
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```
      CALL HEAD1(INC,TITLE,IPAGE)
C
      PRINT 80, EL1,EL2,EL3,((NWD(I),WDMN(I),WDMX(I)),I=1,3),
     1 ((NWS(I),WSMN(I),WSMX(I)),I=1,3),
     2 ((NT(I),TMN(I),TMX(I)),I=1,3),
     3 ((ND(I),DMN(I),DMX(I)),I=1,3)
   80 FORMAT('0',T35,'SUMMARY OF MAXIMUM AND MINIMUN VALUES'//'0',
     1 14X,3(17X,F5.1,' M')/' ',T26,3(19('-'),5X)/'0',
     2 T26,3(' HRS    MIN    MAX ',5X)/' ',
     3 T26,3('-----  -----  -----',5X)/'0',
     4 'WIND DIRECTION (DEG)',T26,3(I5,2F7.1,5X)/'0',
     5 'WIND SPEED (M/S)     ',T26,3(I5,2F7.1,5X)/'0',
     6 'TEMPERATURE (DEG C) ',T26,3(I5,2F7.1,5X)/'0',
     7 'MOISTURE (DEG C OR %)',T26,3(I5,2F7.1,5X))
      PRINT 81, EL1,EL3,EL1,EL2,EL2,EL3,
     * ((NDT(I),DTMN(I),DTMX(I)),I=1,3)
   81 FORMAT(///'0',T26,3(2X,F5.1,' - ',F5.1,' M',7X)/' ',
     1 T26,3(19('-'),5X)/'0',
     2 'DELTA T (DEG C/100M) ',T26,3(I5,2F7.1,5X))
      IF(IP.EQ.1) PRINT 82, NP,PMN,PMX
   82 FORMAT(///'0',T78,'GROUND LEVEL'/' ',T74,19('-')/'0',
     1 'PRECIPITATION (MM)',T74,I5,2F7.1)
C
      PRINT 90
   90 FORMAT('1','*****  LAST DATA RECORD HAS BEEN READ  *****'/'0'
     1'***** EXECUTION SUCCESFULLY TERMINATED *****')
   98 STOP
      END
      SUBROUTINE BLNK
C
C.....CHECK FOR BLANK DATA FIELDS AND REPLACE AS MISSING
C
      COMMON/DATA3/WS1(3),WS2(3),WD1(3),WD2(3),T1(3),T2(3),
     * DT1(3),DT2(3),P1,P2,D1(3)
      COMMON/DATA6/C(16)
      DATA BK/'    '/,S/9999.9/
C
      N=-3
      M=12
      DO 10 I=1,3
      N=N+4
      IF(C(N).EQ.BK) WD1(I)=S
      IF(C(N+1).EQ.BK) WS1(I)=S
      IF(C(N+2).EQ.BK) T1(I)=S
      IF(C(N+3).EQ.BK) D1(I)=S
      IF(C(M+I).EQ.BK) DT1(I)=S
   10 CONTINUE
      IF(C(16).EQ.BK) P1=S
      RETURN
      END
      SUBROUTINE DNQ(IY,ID,IH,K,E1,E2)
C
C.....SUBROUTINE DNQ CHECKS FOR STABLE CONDITIONS DURING THE DAY AN
C     UNSTABLE CONDITIONS AT NIGHT
C
      COMMON/DATA5/IPAGE,INC,TITLE
      DIMENSION NN(7),KK(3)
      DATA NN/'   A','   B','   C','   D','   E','   F','   G'/
C
      IF(ID.LE.81) GO TO 20
      IF(ID.LE.172) GO TO 19
      IF(ID.LE.263) GO TO 18
      IF(ID.LE.357) GO TO 19
      GO TO 20
C
   19 IF(IH.GE.700 .AND. IH.LE.1800) GO TO 23
      GO TO 22
   18 IF(IH.GE.600 .AND. IH.LE.1900) GO TO 23
      GO TO 22
   20 IF(IH.GE.800 .AND. IH.LE.1700) GO TO 23
   22 IF(K.GT.3) GO TO 75
      PRINT 100,IY,ID,IH,NN(K),E1,E2
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
      GO TO 75
   23 IF(K.LT.6) GO TO 75
      PRINT 101,IY,ID,IH,NN(K),E1,E2
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
  100 FORMAT(' ',I3,I4,I5,3X,'STABILITY CLASS',
     1A4,'  DURING NIGHT BETWEEN',F6.1,'M AND',F6.1,'M')
  101 FORMAT(' ',I3,I4,I5,3X,'STABILITY CLASS',
     1A4,'  DURING DAY BETWEEN',F6.1,'M AND',F6.1,'M')
   75 RETURN
      END
      SUBROUTINE HEAD1(INC,TITLE,IPAGE)
C
C.....PRINT HEADER ON EACH PAGE
C
      COMMON/DATA8/TODAY(8)
      DIMENSION TITLE(18)
C
      IF(INC.LT.54) RETURN
      PRINT 100, TODAY,IPAGE,TITLE
      IF(INC.NE.59) PRINT 101
  100 FORMAT('1','PROGRAM: QA',9X,'VERSION: 2',9X,'DATED:',
     * ' FEBRUARY 1982',9X,'RUN DATE: ',8A4,9X,'PAGE:',I4/'0',18A4)
  101 FORMAT('0',' YR DAY HOUR'/'+',' __ ___ ____')
      INC=0
      IPAGE=IPAGE+1
      RETURN
      END
      SUBROUTINE HEAD2(LEV,IS,IW,IT,ID,IP)
C
C.....PRINT INPUT INFORMATION
C
      REAL*8 S
      COMMON/DATA7/LY1,LM1,LD1,LY2,LM2,LD2
      DIMENSION S(4),R(2)
C
      DATA S/'   UPPER','   INTER','MEDIATE ','   LOWER'/
      DATA R/'NO  ','YES '/
C
      PRINT 100
  100 FORMAT('0','CHECK FOLLOWING LEVEL(S) OF DATA: ')
      GO TO (24,20,20,20),LEV
   20 PRINT 101, S(4)
  101 FORMAT(' ',10X,2A8)
      GO TO (24,24,22,26),LEV
   22 PRINT 101, S(2),S(3)
   24 PRINT 101, S(1)
   26 CONTINUE
C
      PRINT 105
  105 FORMAT('0','CHECK FOLLOWING DELTA-T INTERVALS:')
      IF(IS.EQ.0) GO TO 35
      GO TO (34,32,30,32,30,30,30),IS
   30 PRINT 106, S(2),S(3),S(4)
  106 FORMAT(' ',5X,2A8,' MINUS',2A8)
  107 FORMAT(' ',5X,A8,8X,' MINUS',2A8)
      GO TO (34,32,38,32,34,32,32),IS
   32 PRINT 107, S(1),S(2),S(3)
      GO TO (34,38,38,34,34,38,34),IS
   34 PRINT 107, S(1),S(4)
      GO TO 38
   35 PRINT 109
  109 FORMAT(' ',22X,'NONE')
   38 CONTINUE
C
      L=IW+1
      PRINT 110, R(L)
  110 FORMAT('0','CHECK WIND SPEED AND DIRECTION: ',A4)
      L=IT+1
      PRINT 115, R(L)
  115 FORMAT('0','CHECK TEMPERATURE: ',A4)
      L=ID+1
      PRINT 120, R(L)
  120 FORMAT('0','CHECK DEW POINT: ',A4)
      I=IP+1
      PRINT 125, R(L)
  125 FORMAT('0','CHECK PRECIPITATION: ',A4)
C
      PRINT 130, LY1,LM1,LD1,LY2,LM2,LD2
  130 FORMAT('0','CHECK DATA:  BEGINING - ',3I3/'
     *              '                    ENDING   - ',3I3)
C
      PRINT 150
  150 FORMAT('0','SITE:')
C
      RETURN
      END
      SUBROUTINE HEAD3
C
C.....SUBROUTININE HEAD3 PRINTS OUT WIND SPEED AND DIRECTION DATA
C
      COMMON/DATA1/LEV,IS,EL1,EL2,EL3,ICHK,NS(18),IP,ID
      DIMENSION NNN(16)
      DATA NNN/'   N',' NNE','  NE',' ENE','   E',' ESE','  SE',' SSE',
     1'   S',' SSW','  SW',' WSW','   W',' WNW','  NW',' NNW'/
C
      GO TO (25,20,15,25),LEV
   15 PRINT 100, EL1,EL2,NS(17)
      PRINT 100, EL2,EL3,NS(18)
      PRINT 100, EL1,EL3,NS(16)
      PRINT 101, EL1,EL2,NS(9)
      PRINT 101, EL2,EL3,NS(14)
      PRINT 101, EL1,EL3,NS(4)
      PRINT 102, EL1,EL2,NS(10)
      PRINT 102, EL2,EL3,NS(15)
      PRINT 102, EL1,EL3,NS(5)
      PRINT 103, EL1,EL2,NS(6),NS(7),NS(8)
      PRINT 103, EL2,EL3,NS(11),NS(12),NS(13)
      PRINT 103, EL1,EL3,NS(1),NS(2),NS(3)
      GO TO 25
   20 CONTINUE
      PRINT 100, EL1,EL3,NS(16)
      PRINT 101, EL1,EL3,NS(4)
      PRINT 102, EL1,EL3,NS(5)
      PRINT 103, EL1,EL3,NS(1),NS(2),NS(3)
   25 CONTINUE
  100 FORMAT('0','NUMBER OF OCCURRANCES OF WS AT',F6.1,
     1'M LOWER THEN THE WS AT',F6.1,'M EQUALS',I7)
  101 FORMAT('0','NUMBER OF OCCURRANCES OF WD AT',F6.1,
     1'M EQUAL TO WD AT',F6.1,'M EQUALS',I7)
  102 FORMAT('0','NUMBER OF OCCURRANCES OF WS AT',F6.1,
     1'M EQUAL TO WS AT',F6.1,'M EQUALS',I7)
  103 FORMAT('0','WD DIFFERENCE BETWEEN',F6.1,'M AND',F6.1,
     1'M IS GREATER THEN OR EQUAL TO 22.5 DEGREES AND'/' ',10X,
     2'WS AT EITHER LEVEL IS GREATER THEN OR EQUAL TO 2.5M/SEC',
     36X,'OCCURRANCES=',I5/' ',10X,'WS AT EITHER LEVEL IS GREATER',
     4' THEN OR EQUAL TO 5.0M/SEC',5X,' OCCURRANCES=',I5/' ',10X,
     5'WS AT EITHER LEVEL IS GREATER THEN OR EQUAL TO 7.5M/SEC',5X,
     6' OCCURRANCES=',I5)
      RETURN
      END
      SUBROUTINE IDAT (ID,IM,IY,JD)
C
C.....THIS SUBROUTINE CHANGES MONTH AND DAY TO JULIAN DAY
C
      DIMENSION MON(12)
      DATA MON/0,31,59,90,120,151,181,212,243,273,304,334/
      JD=MON(IM)
      JD=JD+ID
      YR=IY*0.25
      IYR=YR
      S=YR-IYR
      IF (S.EQ.0.0.AND.JD.GT.59) JD=JD+1
      RETURN
      END
        SUBROUTINE PCPQ
C
      COMMON/DATA1/LEV,IS,EL1,EL2,EL3,ICHK,NS(18),IP,ID
      COMMON/DATA2/IY1,IY2,ID1,ID2,IH1,IH2
      COMMON/DATA3/WS1(3),WS2(3),WD1(3),WD2(3),T1(3),T2(3),
     * DT1(3),DT2(3),P1,P2,D1(3)
      COMMON/DATA4/KX(3),JJ(3),KP,KT(6),JA,JB,JC
      COMMON/DATA5/IPAGE,INC,TITLE
C
C.....SUBROUTINE PCPQ CHECKS FOR PRECIP OCCURING GREATER THAN
C     8 CONSECUTIVE HOURS AND FOR 1 HOUR PRECIPITATION
C     GREATER THAN OR = 25MM (1INCH)
C
      IF(ICHK.EQ.3) GO TO 60
      IF(P1.GT.254. .OR. P1.LT.0.) GO TO 60
      IF(P1.LT.25.0) GO TO 55
      PRINT 100, IY1,ID1,IH1,P1
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   55 IF(ICHK.EQ.0) GO TO 99
      IF(P2.GT.254. .OR. P2.LT.0.) GO TO 60
      IF(P1.GT.0.0 .AND. P2.GT.0.0) GO TO 75
   60 IF(KP.LT.9) GO TO 70
      PRINT 101,IY2,ID2,IH2,KP
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   70 CONTINUE
      KP=1
      GO TO 99
   75 KP=KP+1
   99 CONTINUE
  100 FORMAT(' ',I3,I4,I5,3X,'PRECIPITATION',
     1 ' OF',F7.1,'MM FELL IN THE GIVEN 1 HOUR PERIOD')
  101 FORMAT(' ',I3,I4,I5,3X,'PRECIPITATION ',
     1'FELL FOR THE PREVIOUS',I3,' HOURS CONSECUTIVELY')
      RETURN
      END
      SUBROUTINE SECTOR(X,J)
C
C.....COMPUTE THE WIND DIRECTION SECTOR
C
      J = 1 + (( X + 11.25 ) / 22.5 )
      IF(J.EQ.17) J=1
      IF(X.GT.365. .OR. X.LT.0.) J=-1
C
      RETURN
      END
      SUBROUTINE STABLE(DELTAT,K)
C
C..........STABILITIES: K=1,2,3,..., STABLITY=A,B,C,...
C
      DIMENSION S(6)
      DATA S/-1.9,-1.7,-1.5,-0.5,1.5,4.0/
C
      DO 100 K=1,6
  100 IF(DELTAT.LE.S(K)) RETURN
      K=7
      RETURN
      END
      SUBROUTINE STABQ1
C
      COMMON/DATA1/LEV,IS,EL1,EL2,EL3,ICHK,NS(18),IP,ID
      COMMON/DATA2/IY1,IY2,ID1,ID2,IH1,IH2
      COMMON/DATA3/WS1(3),WS2(3),WD1(3),WD2(3),T1(3),T2(3),
     * DT1(3),DT2(3),P1,P2,D1(3)
      COMMON/DATA5/IPAGE,INC,TITLE
C
C.....SUBROUTINE STABQ1 CHECKS FOR STABLE OR UNSTABLE CONDITIONS
C     WITH WS GREATER THAN 7.5M/SEC
C   ..CHECKS FOR DELTA T LESS THAN -3.4 DEGREES C PER 100METERS
C     (AUTOCONVECTIVE LAPSE RATE)
C   ..CHECKS FOR STABLE OR UNSTABLE CONDITIONS DURING PRECIPITATION
C
      DIMENSION NN(7)
      DATA NN/'   A','   B','   C','   D','   E','   F','   G'/
C
      GO TO (13,20,20,13,13,20,13),IS
   13 IF(DT1(1).GT.35. .OR. DT1(2).LT.-7.) GO TO 20
      CALL STABLE(DT1(1),K)
      IF(K.EQ.4 .OR. K.EQ.5) GO TO 18
      IF(WS1(1).GT.99.9 .OR. WS1(1).LT.0.) GO TO 15
      IF(WS1(1).GT.7.5) GO TO 16
   15 IF(WS1(3).GT.99.9 .OR. WS1(3).LT.0.) GO TO 17
      IF(WS1(3).GT.7.5) GO TO 16
      GO TO 17
   16 PRINT 100, IY1,ID1,IH1,NN(K),EL1,EL3
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   17 IF(P1.LE.0. .OR. P1.GT.254.) GO TO 19
      IF(IP.NE.1) GO TO 19
      PRINT 101, IY1,ID1,IH1,NN(K),EL1,EL3
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   19 IF(DT1(1).GE.-3.4) GO TO 18
      PRINT 102,IY1,ID1,IH1,DT1(1)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   18 CONTINUE
      CALL DNQ(IY1,ID1,IH1,K,EL1,EL3)
C
   20 GO TO (30,23,30,23,30,23,23),IS
   23 IF(DT1(2).GT.35. .OR. DT1(2).LT.-7.) GO TO 30
      CALL STABLE(DT1(2),L)
      IF(L.EQ.4 .OR. L.EQ.5) GO TO 28
      IF(WS1(1).GT.99.9 .OR. WS1(1).LT.0.) GO TO 25
      IF(WS1(1).GT.7.5) GO TO 26
   25 IF(WS1(2).GT.99.9 .OR. WS1(2).LT.0.) GO TO 27
      IF(WS1(2).GT.7.5) GO TO 26
      GO TO 27
   26 PRINT 100, IY1,ID1,IH1,NN(L),EL1,EL2
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   27 IF(P1.LE.0. .OR. P1.GT.254.) GO TO 29
      IF(IP.NE.1) GO TO 29
      PRINT 101, IY1,ID1,IH1,NN(L),EL1,EL2
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   29 IF(DT1(2).GE.-3.4) GO TO 28
      PRINT 102, IY1,ID1,IH1,DT1(2)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   28 CONTINUE
      CALL DNQ(IY1,ID1,IH1,L,EL1,EL2)
C
   30 GO TO (40,40,33,40,33,33,33),IS
   33 IF(DT1(3).GT.35. .OR. DT1(3).LT.-7.) GO TO 40
      CALL STABLE(DT1(3),M)
      IF(M.EQ.4 .OR. M.EQ.5) GO TO 38
      IF(WS1(2).GT.99.9 .OR. WS1(2).LT.0.) GO TO 35
      IF(WS1(2).GT.7.5) GO TO 36
   35 IF(WS1(3).GT.99.9 .OR. WS1(3).LT.0.) GO TO 37
      IF(WS1(3).GT.7.5) GO TO 36
      GO TO 37
   36 PRINT 100, IY1,ID1,IH1,NN(M),EL2,EL3
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   37 IF(P1.LE.0. .OR. P1.GT.254.) GO TO 39
      IF(IP.NE.1) GO TO 39
      PRINT 101, IY1,ID1,IH1,NN(M),EL2,EL3
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   39 IF(DT1(3).GE.-3.4) GO TO 38
      PRINT 102, IY1,ID1,IH1,DT1(3)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   38 CONTINUE
      CALL DNQ(IY1,ID1,IH1,M,EL2,EL3)
   40 CONTINUE
C
  100 FORMAT(' ',I3,I4,I5,3X,'WIND SPEED ',
     1'GREATER THEN 7.5M/SEC FOR STABILITY CLASS',A4,
     2'  BETWEEN',F6.1,'M AND',F6.1,'M')
  101 FORMAT(' ',I3,I4,I5,3X,
     1'PRECIPITATION OCCURED DURING STABILITY CLASS',A4,
     2'   BETWEEN',F6.1,'M AND',F6.1,'M')
  102 FORMAT(' ',I3,I4,I5,3X,'LAPSE RATE OF ',
     1F6.1,' DEGREES C/100METERS EXCEEDS THE AUTOCONVECTIVE LAPSE RATE')
      RETURN
      END
      SUBROUTINE STABQ2
C
      COMMON/DATA1/LEV,IS,EL1,EL2,EL3,ICHK,NS(18),IP,ID
      COMMON/DATA2/IY1,IY2,ID1,ID2,IH1,IH2
      COMMON/DATA3/WS1(3),WS2(3),WD1(3),WD2(3),T1(3),T2(3),
     * DT1(3),DT2(3),P1,P2,D1(3)
      COMMON/DATA4/KX(3),JJ(3),KP,KT(6),JA,JB,JC
      COMMON/DATA5/IPAGE,INC,TITLE
C
C.....SUBROUTINE STABQ2 CHECKS FOR A GREATER THEN 3 STABILITY
C     CLASS JUMP FROM ONE HOUR TO THE NEXT
C   ..CHECKS FOR SAME STABILITY CLASS GREATER THAN 12 CONSECUTIVE HOURS
C
      DIMENSION NN(7)
      DATA M1,M2,M3/0,0,0/
      DATA NN/'   A','   B','   C','   D','   E','   F','   G'/
      IF(ICHK.EQ.0) GO TO 52
C
      GO TO (15,19,19,15,15,19,15),IS
   15 IF(ICHK.EQ.3) GO TO 20
      IF(DT1(1).GT.35. .OR. DT2(1).GT.35.) GO TO 16
      IF(DT1(1).LT.-7. .OR. DT2(1).LT.-7.) GO TO 16
      CALL STABLE(DT1(1),KA)
      CALL STABLE(DT2(1),KB)
      M1=1
      KC=IABS(KA-KB)
      IF(KC.LE.3) GO TO 14
      PRINT 100, IY1,ID1,IH1,NN(KB),NN(KA),EL1,EL3
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   14 IF(KA.EQ.KB) GO TO 17
   20 IF(JA.GT.12) GO TO 18
   16 JA=1
      GO TO 19
   17 JA=JA+1
      GO TO 19
   18 PRINT 101, IY1,ID1,IH1,NN(KB),JA,EL1,EL3
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
      JA=1
C
   19 IF(IS.EQ.2 .OR. IS.EQ.4 .OR. IS.EQ.6 .OR. IS.EQ.7) GO TO 25
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```
      GO TO 29
   25 IF(ICHK.EQ.3) GO TO 24
      IF(DT1(2).GT.35. .OR. DT2(2).GT.35.) GO TO 26
      IF(DT1(2).LT.-7. .OR. DT2(2).LT.-7.) GO TO 26
      CALL STABLE(DT1(2),KD)
      CALL STABLE(DT2(2),KE)
      M2=1
      KF=IABS(KD-KE)
      IF(KF.LE.3) GO TO 23
      PRINT 100, IY1,ID1,IH1,NN(KE),NN(KD),EL1,EL2
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   23 IF(KD.EQ.KE) GO TO 27
   24 IF(JB.GT.12) GO TO 28
   26 JB=1
      GO TO 29
   27 JB=JB+1
      GO TO 29
   28 PRINT 101, IY1,ID1,IH1,NN(KE),JB,EL1,EL2
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
      JB=1
C
   29 GO TO (39,39,35,39,35,35,35),IS
   35 IF(ICHK.EQ.3) GO TO 34
      IF(DT1(3).GT.35. .OR. DT2(3).GT.35.) GO TO 36
      IF(DT1(3).LT.-7. .OR. DT2(3).LT.-7.) GO TO 36
      CALL STABLE(DT1(3),KG)
      CALL STABLE(DT2(3),KH)
      M3=1
      KI=IABS(KG-KH)
      IF(KI.LE.3) GO TO 33
      PRINT 100, IY1,ID1,IH1,NN(KH),NN(KG),EL2,EL3
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   33 IF(KG.EQ.KH) GO TO 37
   34 IF(JC.GT.12) GO TO 38
   36 JC=1
      GO TO 39
   37 JC=JC+1
      GO TO 39
   38 PRINT 101, IY1,ID1,IH1,NN(KH),JC,EL2,EL3
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
      JC=1
   39 CONTINUE
      IF(ICHK.EQ.3) GO TO 52
C
C       CHECK FOR GREATER THAN 2 STABILITY CLASS DIFFERENCE BETWEEN
C       TWO DIFFERENT STABILITY INTERVALS
C
      IF(IS.NE.5 .AND. IS.NE.7) GO TO 50
      IF(M1.EQ.0 .OR. M3.EQ.0) GO TO 50
      JZ=IABS(KA-KG)
      IF(JZ.LT.3) GO TO 50
      PRINT 102, IY1,ID1,IH1,EL1,EL2,NN(KA),EL2,EL3,NN(KG)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   50 IF(IS.NE.6 .AND. IS.NE.7) GO TO 51
      IF(M2.EQ.0 .OR. M3.EQ.0) GO TO 51
      JZ=IABS(KD-KG)
      IF(JZ.LT.3) GO TO 51
      PRINT 102, IY1,ID1,IH1,EL1,EL2,NN(KD),EL2,EL3,NN(KG)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   51 IF(IS.NE.4 .AND. IS.NE.7) GO TO 52
      IF(M1.EQ.0 .OR. M2.EQ.0) GO TO 52
      JZ=IABS(KA-KD)
      IF(JZ.LT.3) GO TO 52
      PRINT 102, IY1,ID1,IH1,EL1,EL3,NN(KA),EL1,EL2,NN(KD)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
C
  100 FORMAT(' ',I3,I4,I5,3X,'STABILITY CLASS',
     1' JUMPED FROM',A4,'  TO',A4,' OVER ONE HOUR PERIOD',
     2 ' BETWEEN',F6.1,'M AND',F6.1,'M')
  101 FORMAT(' ',I3,I4,I5,3X,'STABILITY CLASS',
     1 A4,' LASTED FOR PREVIOUS',I4,' HOUR PERIOD',
     2 ' BETWEEN',F6.1,'M AND',F6.1,'M')
  102 FORMAT(' ',I3,I4,I5,3X,'STABILITY FOR',
     1F6.1,'M MINUS',F6.1,'M IS',A4,' WHILE STABILITY FOR',F6.1,
     2'M MINUS',F6.1,'M IS',A4)
   52 RETURN
      END
      SUBROUTINE TEMPQ
C
      COMMON/DATA1/LEV,IS,EL1,EL2,EL3,ICHK,NS(18),IP,ID
      COMMON/DATA2/IY1,IY2,ID1,ID2,IH1,IH2
      COMMON/DATA3/WS1(3),WS2(3),WD1(3),WD2(3),T1(3),T2(3),
     * DT1(3),DT2(3),P1,P2,D1(3)
      COMMON/DATA4/KX(3),JJ(3),KP,KT(6),JA,JB,JC
      COMMON/DATA5/IPAGE,INC,TITLE
C
C.....SUBROUTINE TEMPQ CHECKS FOR :
C         DEW POINT (DP) GREATER THAN TEMPERATURE (T)
C         T MINUS DP GREATER THAN OR EQUAL TO 5 DEG C DURING PRECIP
C         T EQUAL TO DP FOR 8 OR MORE CONSECUTIVE HOURS
C         SAME TEMPERATURE FOR 8 OR MORE CONSECUTIVE HOURS
C
      IF(ICHK.EQ.0) GO TO 182
      GO TO (75,50,25,50),LEV
   25 IF(ICHK.EQ.3 .AND. KT(2).GE.8) GO TO 28
      IF(T1(2).GT.99.9 .OR. T1(2).LT.-99.9) GO TO 26
      IF(T2(2).LE.99.9 .AND. T2(2).GE.-99.9) GO TO 27
   26 IF(KT(2).GE.8) GO TO 28
      GO TO 29
   27 IF(T1(2).EQ.T2(2)) GO TO 30
      IF(KT(2).LT.8) GO TO 29
   28 PRINT 100, IY2,ID2,IH2,EL2,T2(2),KT(2)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
  100 FORMAT(' ',I3,I4,I5,3X,'HEIGHT=',F6.1,
     1'M',3X,'TEMPERATURE=',F6.1,'DEGREES C FOR PREVIOUS',I5,
     2' HOUR PERIOD')
   29 KT(2)=1
      GO TO 50
   30 KT(2)=KT(2)+1
   50 CONTINUE
      IF(ICHK.EQ.3 .AND. KT(3).GE.8) GO TO 58
      IF(T1(3).GT.99.9 .OR. T1(3).LT.-99.9) GO TO 56
      IF(T2(3).LE.99.9 .AND. T2(3).GE.-99.9) GO TO 57
   56 IF(KT(3).GE.8) GO TO 58
      GO TO 59
   57 IF(T1(3).EQ.T2(3)) GO TO 60
      IF(KT(3).LT.8) GO TO 59
   58 PRINT 100, IY2,ID2,IH2,EL3,T2(3),KT(3)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   59 KT(3)=1
      GO TO 74
   60 KT(3)=KT(3)+1
   74 IF(LEV.EQ.4) GO TO 82
   75 CONTINUE
      IF(ICHK.EQ.3 .AND. KT(1).GE.8) GO TO 78
      IF(T1(1).GT.99.9 .OR. T1(1).LT.-99.9) GO TO 76
      IF(T2(1).LE.99.9 .AND. T2(1).GE.-99.9) GO TO 77
   76 IF(KT(1).GE.8) GO TO 78
      GO TO 79
   77 IF(T1(1).EQ.T2(1)) GO TO 81
      IF(KT(1).LT.8) GO TO 79
   78 PRINT 100, IY2,ID2,IH2,EL1,T2(1),KT(1)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   79 KT(1)=1
      GO TO 82
   81 KT(1)=KT(1)+1
   82 CONTINUE
C
      IF(ID.NE.1) GO TO 500
C
      GO TO (175,150,125,150),LEV
  125 IF(ICHK.EQ.3 .AND. KT(4).GE.8) GO TO 128
      IF(T1(2).GT.99.9 .OR. T1(2).LT.-99.9) GO TO 126
      IF(D1(2).LE.99.9 .AND. D1(2).GE.-99.9) GO TO 127
  126 IF(KT(4).GE.8) GO TO 128
      GO TO 129
  127 IF(T1(2).EQ.D1(2)) GO TO 130
      IF(KT(4).LT.8) GO TO 129
  128 PRINT 101, IY1,ID1,IH1,EL2,T1(2),KT(4)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
  129 KT(4)=0
      GO TO 150
  130 KT(4)=KT(4)+1
  150 CONTINUE
      IF(ICHK.EQ.3 .AND. KT(5).GE.8) GO TO 158
      IF(T1(3).GT.99.9 .OR. T1(3).LT.-99.9) GO TO 156
      IF(D1(3).LE.99.9 .AND. D1(3).GE.-99.9) GO TO 157
  156 IF(KT(5).GE.8) GO TO 158
      GO TO 159
  157 IF(T1(3).EQ.D1(3)) GO TO 160
      IF(KT(5).LT.8) GO TO 159
  158 PRINT 101, IY1,ID1,IH1,EL3,T1(3),KT(5)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
  159 KT(5)=0
      GO TO 174
  160 KT(5)=KT(5)+1
  174 IF(LEV.EQ.4) GO TO 182
  175 CONTINUE
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      IF(ICHK.EQ.3 .AND. KT(6).GE.8) GO TO 178
      IF(T1(1).GT.99.9 .OR. T1(1).LT.-99.9) GO TO 176
      IF(D1(1).LE.99.9 .AND. D1(1).GE.-99.9) GO TO 177
  176 IF(KT(6).GE.8) GO TO 178
      GO TO 179
  177 IF(T1(1).EQ.D1(1)) GO TO 181
      IF(KT(6).LT.8) GO TO 179
  178 PRINT 101, IY1,ID1,IH1,EL1,T1(1),KT(6)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
  179 KT(6)=0
      GO TO 182
  181 KT(6)=KT(6)+1
  182 CONTINUE
  101 FORMAT(' ',I3,I4,I5,3X,'HEIGHT=',
     1F6.1,'M',3X,'TEMPERATURE EQUALS DEW POINT =',F6.1,
     2' DEGREES C FOR LAST ',I5,' HOURS')
C
      IF(ICHK.EQ.3) GO TO 500
      GO TO (250,200,190,200),LEV
  190 IF(T1(2).GT.99.9 .OR. D1(2).GT.99.9) GO TO 200
      IF(T1(2).LT.-99.9 .OR. D1(2).LT.-99.9) GO TO 200
      IF(D1(2).LE.T1(2)) GO TO 195
      PRINT 102,IY1,ID1,IH1,EL2,D1(2),T1(2)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
  195 IF(IP.EQ.0) GO TO 200
      IF(P1.LE.0. .OR. P1.GT.254.) GO TO 200
      DD=T1(2)-D1(2)
      IF(DD.LE.5.0) GO TO 200
      PRINT 103, IY1,ID1,IH1,EL2,DD,P1
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
  200 IF(T1(3).GT.99.9 .OR. D1(3).GT.99.9) GO TO 225
      IF(T1(3).LT.-99.9 .OR. D1(3).LT.-99.9) GO TO 225
      IF(D1(3).LE.T1(3)) GO TO 215
      PRINT 102,IY1,ID1,IH1,EL3,D1(3),T1(3)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
  215 IF(IP.EQ.0) GO TO 225
      IF(P1.LE.0. .OR. P1.GT.254.) GO TO 225
      DD=T1(3)-D1(3)
      IF(DD.LE.5.0) GO TO 225
      PRINT 103, IY1,ID1,IH1,EL3,DD,P1
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
  225 IF(LEV.EQ.4) GO TO 500
  250 IF(T1(1).GT.99.9 .OR. D1(1).GT.99.9) GO TO 500
      IF(T1(1).LT.-99.9 .OR. D1(1).LT.-99.9) GO TO 500
      IF(D1(1).LE.T1(1)) GO TO 275
      PRINT 102, IY1,ID1,IH1,EL1,D1(1),T1(1)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
  275 IF(IP.EQ.0) GO TO 500
      IF(P1.LE.0. .OR. P1.GT.254.) GO TO 500
      DD=T1(1)-D1(1)
      IF(DD.LE.5.0) GO TO 500
      PRINT 103, IY1,ID1,IH1,EL1,DD,P1
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
  102 FORMAT(' ',I3,I4,I5,3X,'HEIGHT=',F6.1,
     1'M',3X,' DEW POINT (',F6.1,' ) IS GREATER THEN TEMPERATURE (',
     2F6.1,' ) ')
  103 FORMAT(' ',I3,I4,I5,3X,'HEIGHT=',F6.1,
     1'M',3X,'TEMPERATURE GREATER THEN DEW POINT BY',F6.1,
     2' DEGREES C DURING PRECIPITATION OF',F6.1,' MM')
  500 CONTINUE
      RETURN
      END
      SUBROUTINE WSWDQ
C
C.....THIS SUBROUTINE CHECKS THE WIND SPEED AND WIND DIRECTION DATA
C
      COMMON/DATA1/LEV,IS,EL1,EL2,EL3,ICHK,NS(18),IP,ID
      COMMON/DATA2/IY1,IY2,ID1,ID2,IH1,IH2
      COMMON/DATA3/WS1(3),WS2(3),WD1(3),WD2(3),T1(3),T2(3),
     * DT1(3),DT2(3),P1,P2,D1(3)
      COMMON/DATA4/KX(3),JJ(3),KP,KT(6),JA,JB,JC
      COMMON/DATA5/IPAGE,INC,TITLE
C
      DIMENSION JK(3),NNN(16),G(3)
      DATA G/2.5,5.0,7.5/
C
      DATA NNN/'   N',' NNE','  NE',' ENE','   E',' ESE','  SE',' SSE',
     1'   S',' SSW','  SW',' WSW','   W',' WNW','  NW',' NNW'/
C
      IF(ICHK.EQ.3) GO TO 75
C
C     CHECK FOR WIND SPEED GREATER THEN 25M/SEC
C
      IF(LEV.NE.3) GO TO 50
      IF(WS1(2).GT.99.9) GO TO 50
      IF(WS1(2).LT.25.0) GO TO 50
      PRINT 100, IY1,ID1,IH1,EL2,WS1(2)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   50 IF(LEV.EQ.1) GO TO 51
      IF(WS1(3).GT.99.9) GO TO 51
      IF(WS1(3).LT.25.0) GO TO 53
      PRINT 100, IY1,ID1,IH1,EL3,WS1(3)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   53 IF(LEV.EQ.4) GO TO 52
   51 IF(WS1(1).GT.99.9) GO TO 52
      IF(WS1(1).LT.25.0) GO TO 52
      PRINT 100,IY1,ID1,IH1,EL1,WS1(1)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
   52 CONTINUE
  100 FORMAT(' ',I3,I4,I5,3X,'HEIGHT=',F6.1,'M'
     1,5X,'WIND SPEED OF',F6.1,'M/SEC OCCURRED')
C
C     CHECK FOR WS GREATER THEN 2.5,5.0,7.5 M/SEC
C            WHILE WD'-WD'' GREATER THEN 22.5 DEGREES
C     CHECK FOR WD SAME AT TWO LEVELS
C     CHECK FOR WS SAME AT TWO LEVELS
C     CHECK FOR WS LOWER LEVEL GREATER THAN WS UPPER LEVEL
C
      GO TO (75,55,55,75),LEV
   55 IF(WD1(1).GT.365.0 .OR. WD1(3).GT.365.0) GO TO 62
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      IF(WD1(1).LT.0. .OR. WD1(3).LT.0.) GO TO 62
      X=ABS(WD1(1)-WD1(3))
      IF(X.LT.22.5) GO TO 61
      IF(WS1(1).GE.2.5 .AND. WS1(1).LT.99.9 .OR. WS1(3).GE.2.5 .AND.
     1 WS1(3).LT.99.9) NS(1)=NS(1)+1
      IF(WS1(1).GE.5.0 .AND. WS1(1).LT.99.9 .OR. WS1(3).GE.5.0 .AND.
     1 WS1(3).LT.99.9) NS(2)=NS(2)+1
      IF(WS1(1).GE.7.5 .AND. WS1(1).LT.99.9 .OR. WS1(3).GE.7.5 .AND.
     1 WS1(3).LT.99.9) NS(3)=NS(3)+1
   61 IF(X.EQ.0.0) NS(4)=NS(4)+1
   62 IF(WS1(1).GT.99.9 .OR. WS1(3).GT.99.9) GO TO 60
      Y=WS1(1)-WS1(3)
      IF(Y.EQ.0.0) NS(5)=NS(5)+1
      IF(WS1(3).GT.WS1(1)) NS(16)=NS(16)+1
   60 CONTINUE
      IF(WD1(1).GT.365.0 .OR. WD1(2).GT.365.0) GO TO 85
      IF(WD1(1).LT.0. .OR. WD1(2).LT.0.) GO TO 85
      X=ABS(WD1(1)-WD1(2))
      IF(X.LT.22.5) GO TO 83
      IF(WS1(1).GE.2.5 .AND. WS1(1).LT.99.9 .OR. WS1(2).GE.2.5 .AND.
     1 WS1(2).LT.99.9) NS(6)=NS(6)+1
      IF(WS1(1).GE.5.0 .AND. WS1(1).LT.99.9 .OR. WS1(2).GE.5.0 .AND.
     1 WS1(2).LT.99.9) NS(7)=NS(7)+1
      IF(WS1(1).GE.7.5 .AND. WS1(1).LT.99.9 .OR. WS1(2).GE.7.5 .AND.
     1 WS1(2).LT.99.9) NS(8)=NS(8)+1
   83 IF(X.EQ.0) NS(9)=NS(9)+1
   85 IF(WS1(1).GT.99.9 .OR. WS1(2).GT.99.9) GO TO 80
      Y=WS1(1)-WS1(2)
      IF(Y.EQ.0.0) NS(10)=NS(10)+1
      IF(WS1(2).GT.WS1(1)) NS(17)=NS(17)+1
   80 CONTINUE
      IF(WD1(2).GT.365.0 .OR. WD1(3).GT.365.0) GO TO 95
      IF(WD1(2).LT.0. .OR. WD1(3).LT.0.) GO TO 95
      X=ABS(WD1(2)-WD1(3))
      IF(X.LT.22.5) GO TO 93
      IF(WS1(2).GE.2.5 .AND. WS1(2).LT.99.9 .OR. WS1(3).GE.2.5 .AND.
     1 WS1(3).LT.99.9) NS(11)=NS(11)+1
      IF(WS1(2).GE.5.0 .AND. WS1(2).LT.99.9 .OR. WS1(3).GE.5.0 .AND.
     1 WS1(3).LT.99.9) NS(12)=NS(12)+1
      IF(WS1(2).GE.7.5 .AND. WS1(2).LT.99.9 .OR. WS1(3).GE.7.5 .AND.
     1 WS1(3).LT.99.9) NS(13)=NS(13)+1
   93 IF(X.EQ.0.0) NS(14)=NS(14)+1
   95 IF(WS1(2).GT.99.9 .OR. WS1(3).GT.99.9) GO TO 75
      Y=WS1(2)-WS1(3)
      IF(Y.EQ.0.0) NS(15)=NS(15)+1
      IF(WS1(3).GT.WS1(2)) NS(18)=NS(18)+1
   75 CONTINUE
      IF(ICHK.EQ.0) GO TO 300
C
C     CHECK FOR WIND DIRECTION FROM SAME SECTOR FOR MORE THEN 8 HOURS
C
  106 FORMAT(' ',I3,I4,I5,3X,'HEIGHT=',F6.1,'M'
     1,5X,'WIND FROM SECTOR',A4,' FOR PREVIOUS',I4,' HOUR PERIOD')
      IF(LEV.EQ.1) GO TO 200
      GO TO (166,190,166,190),LEV
  166 IF(ICHK.EQ.3 .AND. KX(2).GT.8) GO TO 167
      CALL SECTOR(WD1(2),JK(2))
      IF(JK(2).EQ.-1 .OR. JJ(2).EQ.-1) GO TO 167
      IF(JJ(2).EQ.JK(2)) GO TO 165
  167 IF(KX(2).LT.8) GO TO 170
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      N=JJ(2)
      PRINT 106,IY2,ID2,IH2,EL2,NNN(N),KX(2)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
  170 KX(2)=1
      GO TO 180
  165 KX(2)=KX(2)+1
  180 JJ(2)=JK(2)
      IF(ICHK.EQ.3 .AND. KX(3).GT.8) GO TO 187
  190 CALL SECTOR(WD1(3),JK(3))
      IF(JK(3).EQ.-1 .OR. JJ(3).EQ.-1) GO TO 187
      IF(JJ(3).EQ.JK(3)) GO TO 195
  187 IF(KX(3).LT.8) GO TO 188
      N=JJ(3)
      PRINT 106, IY2,ID2,IH2,EL3,NNN(N),KX(3)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
  188 KX(3)=1
      GO TO 191
  195 KX(3)=KX(3)+1
  191 JJ(3)=JK(3)
      IF(LEV.EQ.4) GO TO 300
      IF(ICHK.EQ.3 .AND. KX(1).GT.8) GO TO 210
  200 CALL SECTOR(WD1(1),JK(1))
      IF(JK(1).EQ.-1 .OR. JJ(1).EQ.-1) GO TO 210
      IF(JJ(1).EQ.JK(1)) GO TO 215
  210 IF(KX(1).LT.8) GO TO 218
      N=JJ(1)
      PRINT 106, IY2,ID2,IH2,EL1,NNN(N),KX(1)
      INC=INC+1
      CALL HEAD1(INC,TITLE,IPAGE)
  218 KX(1)=1
      GO TO 216
  215 KX(1)=KX(1)+1
  216 JJ(1)=JK(1)
  300 CONTINUE
      RETURN
      END
```

APPENDIX H

PROGRAM LISTING OF STABQ

```
C
C   ******************************************************************
C   *                                                                *
C   *                           STABQ                                *
C   *                                                                *
C   *        THIS PROGRAM CALCULATES PERIODS OF OCCURENCE OF         *
C   *        STABILITY CLASS BASED ON DELTA-T OR SIGMA THETA         *
C   *        FROM A DATA FILE IN THE NRC STANDARD FORMAT             *
C   *                                                                *
C   * PROGRAMMER: WILLIAM SNELL                                      *
C   * DATE: APRIL 1978                                               *
C   * VERSION: 1                                                     *
C   *                                                                *
C   * MODIFIED: W. SNELL                                             *
C   * DATE: FEBRUARY 1982                                            *
C   * VERSION: 2                                                     *
C   *                                                                *
C   ******************************************************************
C
      REAL*8 HR,TL
      COMMON/DATA1/SG(3),DT(3),C(6)
      DIMENSION TODAY(8),A(200),HR(13),IS1(3),IS2(3),IC(3),B(6),
     1 ICHK(7,13,3),ITOT(7,3),TITLE(18),H(3),NN(7)
      DATA HR/'     1  ','     2  ','     3  ','     4  ',
     1       '     5  ','     6  ','   7-11 ','  12-23 ',
     2       '  24-47 ','  48-71 ','  72-95 ','  96-119',
     3       '   >120'/
      DATA NN/'A','B','C','D','E','F','G'/
      DATA IC/3*1/,ITOT,ICHK,IS2/21*0,273*0,3*9/
      DATA H/'DELT','A-T ','    ','SIGM','A TH','ETA '/
C
      CALL RHH240 (TODAY)
      PRINT 200, TODAY
C
C     READ AND WRITE OUT HEADING OF DATA FILE
C
      READ(1,10) A
   10 FORMAT(4(40A4/),40A4)
      PRINT 11, A
   11 FORMAT('-',10(' ',20A4/))
C
C     READ INPUT DATA
C
C.... TITLE = TITLE PRINTED ON EACH PAGE
C.... IS = 1, STABILITY BASED ON DELTA-T
C.... IS = 2, STABILITY BASED ON SIGMA THETA
C.... JY,JM,JD = START YEAR, MONTH AND DAY
C.... KY,KM,KD = END   YEAR, MONTH AND DAY
C
      READ(5,12) TITLE,IS,JY,JM,JD,KY,KM,KD
   12 FORMAT(18A4/I1,2(1X,3I2))
      CALL IDAT(JD,JM,JY,JJD)
      CALL IDAT(KD,KM,KY,JKD)
      ISTRT=JY*1000+JJD
      IEND=KY*1000+JKD
      N1=1
      IF(IS.EQ.2) N1=4
      N2=IS*3
      PRINT 206, TITLE,(H(N),N=N1,N2),JY,JM,JD,KY,KM,KD
C
```

```
C     READ STABILITY AND CATEGORIZE INTO A STABILITY CLASS
C
   75 READ(1,101,END=999) IY,ID,((H(I),SG(I)),I=1,3),(DT(I),I=1,3),
     * (C(I),I=1,6)
  101 FORMAT(6X,I2,I3,4X,3(F5.1,10X,F5.1,15X),3F5.1,
     * T16,3(16X,A4,15X),3(1X,A4))
      IDATE=IY*1000+ID
      IF(IDATE.LT.ISTRT) GO TO 75
      IF(IDATE.GT.IEND)  GO TO 999
      CALL BLNK
C
      DO 15 N=1,3
      IF(IS.EQ.1) CALL STABLE(DT(N),J)
      IF(IS.EQ.2) CALL SIGMA(SG(N),J)
   15 IS1(N)=J
C
C     SUMMARIZE DATA
C
      DO 50 N=1,3
      IF(IS1(N).EQ.9) GO TO 30
      IF(IS2(N).EQ.9) GO TO 50
      IF(IS1(N).EQ.IS2(N)) GO TO 40
   30 L=IS2(N)
      IF(L.EQ.9) GO TO 50
      CALL CHK(IC(N),M)
      IF(IC(N).GT.ITOT(L,N)) ITOT(L,N)=IC(N)
      ICHK(L,M,N)=ICHK(L,M,N)+1
      IC(N)=1
      GO TO 50
   40 IC(N)=IC(N)+1
   50 CONTINUE
C
      DO 60 N=1,3
   60 IS2(N)=IS1(N)
C
      GO TO 75
C
  999 CONTINUE
C
      DO 65 N=1,3
      L=IS2(N)
      IF(L.EQ.9) GO TO 65
      CALL CHK(IC(N),M)
      IF(IC(N).GT.ITOT(L,N)) ITOT(L,N)=IC(N)
      ICHK(L,M,N)=ICHK(L,M,N)+1
   65 CONTINUE
C
C     PRINT OUT RESULTS
C
      DO 151 N=1,3
      PRINT 200, TODAY
      PRINT 207, TITLE
      IF(IS.EQ.2) GO TO 140
      IF(N.EQ.1) PRINT 203, H(1),H(3)
      IF(N.EQ.2) PRINT 203, H(1),H(2)
      IF(N.EQ.3) PRINT 203, H(2),H(3)
      GO TO 145
  140 PRINT 205, H(N)
  145 PRINT 201, (NN(I),I=1,7)
      DO 150 M=1,13
  150 PRINT 202, HR(M),(ICHK(L,M,N),L=1,7)
      PRINT 204, (ITOT(L,N),L=1,7)
  151 CONTINUE
C
C     FORMAT STATEMENTS
C
  200 FORMAT('1','PROGRAM: STABQ',10X,'VERSION: 2',10X,
     1 'DATED: FEBRUARY 1982',15X,'RUN DATE: ',8A4)
  201 FORMAT('0',32X,'NUMBER OF OCCURENCES'/' ',' PERIOD OF'/' ',
     1' OCCURENCE',28X,'STABILITY'/' ','  (HOURS)',
     23X,7(7X,A1)/' ',' ==========',3X,7(5X,'==='))
  202 FORMAT('0',A8,6X,7(I6,2X))
  203 FORMAT('0','STABILITY BASED ON DELTA-T BETWEEN ',
     1 F5.1,'-',F5.1,' METERS')
  204 FORMAT('0','LONGEST CASE',7(2X,I6))
  205 FORMAT('0','STABILITY BASED ON SIGMA THETA AT',F6.1,' METERS')
  206 FORMAT(/////'0','INPUT OPTIONS:'/'0','TITLE: ',
     1 18A4/'0','COMPUTE STABILITY BASED ON: ',3A4/'0',
     2 'START DATE:',3I3/' ','END   DATE:',3I3)
  207 FORMAT('-',18A4)
      STOP
      END
      SUBROUTINE BLNK
C
C.....CHECK FOR BLANK DATA FIELDS
C
      COMMON/DATA1/SG(3),DT(3),C(6)
      DATA BK/'    '/,Z/9999.9/
      DO 10 I=1,3
      IF(C(I).EQ.BK) SG(I)=Z
   10 IF(C(I+3).EQ.BK) DT(I)=Z
      RETURN
      END
      SUBROUTINE CHK(IC,M)
C
C.....CATEGORIZIES OCCURENCE INTERVALS
C
      DIMENSION N(12)
      DATA N/1,2,3,4,5,6,11,23,47,71,95,119/
      DO 10 M=1,12
   10 IF(IC.LE.N(M)) RETURN
      M=13
      RETURN
      END
      SUBROUTINE IDAT (ID,IM,IY,JD)
C========THIS SUBROUTINE CHANGES MONTH AND DAY TO JULIAN DAY
      DIMENSION ID(2),IM(2),IY(2),JD(2),YR(2),IYR(2),MON(12)
      DATA MON/0,31,59,90,120,151,181,212,243,273,304,334/
      DO 20 N=1,2
      IMM=IM(N)
      JD(N)=MON(IMM)
      JD(N)=JD(N)+ID(N)
      YR(N)=IY(N)*0.25
      IYR(N)=YR(N)
      S=YR(N)-IYR(N)
      IF (S.EQ.0.0.AND.JD(N).GT.59) JD(N)=JD(N)+1
   20 CONTINUE
      RETURN
      END
      SUBROUTINE SIGMA(ST,KK)
```

```
C---------THIS SUBROUTINE CALCULATES STABILITY FROM SIGMA THETA
      DIMENSION S(6)
      DATA S/22.5,17.5,12.5,7.5,3.8,2.1/
      KK=9
      IF(ST.LT.0. .OR. ST.GT.365.) RETURN
      DO 100 KK=1,6
  100 IF(ST.GE.S(KK)) RETURN
      KK=7
      RETURN
      END
      SUBROUTINE STABLE(ST,KK)
      DIMENSION S(6)
C---------THIS SUBROUTINE CALCULATES STABILITY CLASS
C---------KK=1,2,3...CORRESPONDS TO STABILITY CLASSES A,B,C...
      DATA S/-1.9,-1.7,-1.5,-0.5,1.5,4.0/
      KK=9
      IF(ST.LT.-7.0 .OR. ST .GT.35.0) RETURN
      DO 100 KK = 1,6
  100 IF(ST.LE.S(KK)) RETURN
      KK = 7
      RETURN
      END
```

APPENDIX I

PROGRAM LISTING OF TDP

```
C
C ******************************************************************
C *                                                                *
C *                          TDP                                   *
C *                                                                *
C *      THIS PROGRAM CALCULATES MONTHLY ANNUAL AVERAGES           *
C *        OF TEMPERATURE, DEW POINT, WIND SPEED (RMS)             *
C *                 AND WET BULB (CALCULATED)                      *
C *                                                                *
C * PROGRAMMER:  WILLIAM SNELL                                     *
C * DATE:  APRIL  1978                                             *
C * VERSION:  1                                                    *
C *                                                                *
C * REVISED: R. CODELL  (TO INCLUDE WET BULB AND RMS WIND SPEED)   *
C * DATE: OCTOBER 1981                                             *
C * VERSION: 2                                                     *
C *                                                                *
C * REVISED: W. SNELL                                              *
C * DATE: MARCH 1982                                               *
C * VERSION: 3                                                     *
C *                                                                *
C ******************************************************************
C
      REAL*8 YY
C
      COMMON/DATA1/ T(3),D(3),W(3),TX(3),DX(3),TN(3),DN(3),C(9)
      COMMON/DATA2/ TT(3),TWETB(3),TW(3),ITW(3),IWETB(3),ITT(3),
     * DD(3),IDD(3),WX(3),BX(3),WN(3),BN(3),WBULB(3)
      COMMON/DATA3/ TTX(3),TDX(3),TTN(3),TDN(3),
     * TWX(3),TBX(3),TWN(3),TBN(3)
C
      DIMENSION TODAY(8),A(200),YY(13),B(3),TTW(3),BAN(3),WAN(3),
     1  TAVG(3),KT(3),KD(3),TTOT(3),DTOT(3),TAN(3),DAVG(3),
     2  DAN(3),TITLE(18),BAVG(3),KW(3),WTOT(3),KB(3),BTOT(3),
     3  PT(3),PW(3),PD(3),PB(3),IPT(3),IPD(3),IPW(3),IPB(3),
     4  TAP(3),WAP(3),DAP(3),BAP(3),
     5  PTX(3),PDX(3),PBX(3),
     6  WAVG(3),PWX(3),PWN(3),PDN(3),PTN(3),PBN(3)
C
      DATA YY/'JANUARY ','FEBURARY','MARCH   ','APRIL   ',
     1  'MAY     ','JUNE    ','JULY    ','AUGUST  ',
     2  'SEPTMBER','OCTOBER ','NOVEMBER','DECEMBER','ANNUAL  '/
C
      DATA TTW,WAVG,BAVG/9*0./
      DATA IPW,IPT,IPD,IPB/12*0/,PW,PT,PD,PB/12*0./
      DATA PTX,PBX,PWX,PDX/12*-99.9/,PTN,PDN,PBN,PWN/12*99.9/
C
      CALL RHB240 (TODAY)
      PRINT 25, TODAY
   25 FORMAT('1','PROGRAM: TDP',10X,'VERSION: 3',10X,'DATED:',
     * ' MARCH 1982',15X,'RUN DATE: ',8A4)
C
      READ(1,10) A
   10 FORMAT(4(40A4/),40A4)
      PRINT 11, A
   11 FORMAT('0','SITE: '/'0',10(' ',20A4/))
C
      READ(5,12) TITLE
   12 FORMAT(18A4)
      PRINT 18, TITLE
   18 FORMAT(////'0','TITLE: ',18A4)
      READ(5,13) PBAR,LY1,LM1,LD1,LY2,LM2,LD2
   13 FORMAT(F10.0/3I2,1X,3I2)
      PRINT 14, PBAR,LY1,LM1,LD1,LY2,LM2,LD2
   14 FORMAT(////'0','INPUT DATA:'/'0','BAROMETRIC PRESSURE: ',
     * F7.1/'0','START DATE:',3I3/' ','END   DATE:',3I3)
      ISTRT=LY1*10000+LM1*100+LD1
      IEND= LY2*10000+LM2*100+LD2
C
      ICHK=9
      IANN=0
      KCK=0
      KCT=13
      KK=0
C
      CALL SET1
      CALL SET2
      GO TO 75
   17 JY=IY
      JM=IM
      KCK=1
      GO TO 23
C
C     READ IN  DATA AND COMPUTE MONTH AND DAY
C
   75 READ(1,100,END=998) IY,JD,KH,((H(I),W(I),T(I),D(I)),I=1,3),
     * (C(I),I=1,9)
  100 FORMAT(6X,I2,I3,I4,3(F5.1,5X,F5.1,5X,2F5.1,5X),
     * T16,3(11X,A4,6X,A4,1X,A4,5X))
C
      CALL JDAT(IY,JD,IM,ID)
      IDATE=IY*10000+IM*100+ID
      IF(IDATE.LT.ISTRT) GO TO 75
      IF(IDATE.GT.IEND) GO TO 998
      CALL BLNK
      IF(KCK.EQ.0) GO TO 17
      IF(IM.NE.JM) GO TO 50
C
C     TOTAL UP MONTHLY VALUES
C
   23 CONTINUE
      DO 30 N=1,3
C  RMS WINDSPEED
      IF(W(N).LT.0. .OR. W(N).GT.99.9) GO TO 26
      TW(N)=TW(N)+W(N)**2
      ITW(N)=ITW(N)+1
   26 CONTINUE
      WBULB(N)=99.9
C  TEMPERATURE
      IF(T(N).LT.-99.9 .OR. T(N).GT.99.9) GO TO 28
      TT(N)=TT(N)+T(N)
      ITT(N)=ITT(N)+1
C  CALCULATE   WET BULB TEMP
      IF(D(N).LT.-99.9 .OR. D(N).GT.99.9) GO TO 30
      IF(D(N).GT.T(N)) GO TO 28
      TFA=T(N)*1.8+32.0
      DFA=D(N)*1.8+32.0
      CALL PSY(TFA,DFA,PBAR,WFA,PVAP,HUMRAT,ENTHAL,VOLUME,
     1  VAPR,RELHUM)
      WBULB(N)=(WFA-32.0)/1.8
      TWETB(N)=TWETB(N)+WBULB(N)
      IWETB(N)=IWETB(N)+1
      GO TO 29
C  DEW POINT
   28 IF(D(N).LT.-99.9 .OR. D(N).GT.99.9) GO TO 30
   29 DD(N)=DD(N)+D(N)
      IDD(N)=IDD(N)+1
 30   CONTINUE
C
      CALL MAXMIN
C
      GO TO 75
C
C     COMPUTE MONTHLY AVERAGES AND PRINT
C
   50 CONTINUE
      DO 55 N=1,3
      WAVG(N)=999.9
      BAVG(N)=999.9
      TAVG(N)=999.9
      DAVG(N)=999.9
      IF(ITW(N).GT.0) WAVG(N)=SQRT(TW(N)/ITW(N))
      IF(IWETB(N).GT.0) BAVG(N)=TWETB(N)/IWETB(N)
      IF(ITT(N).GT.0) TAVG(N)=TT(N)/ITT(N)
      IF(IDD(N).GT.0) DAVG(N)=DD(N)/IDD(N)
      KW(N)=KW(N)+ITW(N)
      WTOT(N)=WTOT(N)+TW(N)
      KB(N)=KB(N)+IWETB(N)
      BTOT(N)=BTOT(N)+TWETB(N)
      KT(N)=KT(N)+ITT(N)
      TTOT(N)=TTOT(N)+TT(N)
      KD(N)=KD(N)+IDD(N)
   55 DTOT(N)=DTOT(N)+DD(N)
C
      DO 60 N=1,3
      IF(TX(N).GT.TTX(N)) TTX(N)=TX(N)
      IF(DX(N).GT.TDX(N)) TDX(N)=DX(N)
      IF(WX(N).GT.TWX(N)) TWX(N)=WX(N)
      IF(BX(N).GT.TBX(N)) TBX(N)=BX(N)
      IF(TN(N).LT.TTN(N)) TTN(N)=TN(N)
      IF(DN(N).LT.TDN(N)) TDN(N)=DN(N)
      IF(WN(N).LT.TWN(N)) TWN(N)=WN(N)
      IF(BN(N).LT.TBN(N)) TBN(N)=BN(N)
   60 CONTINUE
C
      IF(ICHK.NE.9) GO TO 65
      PRINT 204
      PRINT 25, TODAY
      PRINT 201, TITLE,(H(I),I=1,3)
      ICHK=0
   65 CONTINUE
C
      PRINT 202, JY,YY(JM),
     1 ((WAVG(N),WN(N),WX(N),ITW(N)),N=1,3),
     2 ((TAVG(N),TN(N),TX(N),ITT(N)),N=1,3),
     3 ((DAVG(N),DN(N),DX(N),IDD(N)),N=1,3),
     4 ((BAVG(N),BN(N),BX(N),IWETB(N)),N=1,3)
  201 FORMAT('1',18A4/'0',T40,3(6X,F5.1,' METERS',10X)/' ',
     1 T35,3(5X,23('='))/' ','YEAR  MONTH  ',T35,
     2 3(5X,'  AVG   MIN   MAX   HRS')/' ',
     3 '---- --------',T36,3(4X,4('----- ')))
  202 FORMAT('0','19',I2,1X,A8,
     1 T17,'WIND SPEED  (M/S)',T35,3(5X,3(F5.1,1X),I5),/' ',
     2 T17,'TEMPERATURE  (C)',T35,3(5X,3(F5.1,1X),I5),/' ',
     3 T17,'DEW POINT    (C)',T35,3(5X,3(F5.1,1X),I5),/' ',
     4 T17,'WET BULB     (C)',T35,3(5X,3(F5.1,1X),I5))
  204 FORMAT(///'0','*** WIND SPEED IS ROOT-MEAN-SQUARE ',
     * 'WIND SPEED'/' ','*** WET BULB IS CALCULATED FROM ',
     * 'TEMPERATURE, DEW POINT AND PRESSURE')
C
      JM=IM
      ICHK=ICHK+1
      IF(JY.NE.IY) GO TO 70
      IF(KK.EQ.1) GO TO 70
      GO TO 80
C
C     COMPUTE ANNUAL AVERAGE AND PRINT
C
   70 CONTINUE
      IF(ICHK.NE.9) GO TO 71
      PRINT 204
      PRINT 25, TODAY
      PRINT 201, TITLE,(H(I),I=1,3)
      ICHK=0
   71 CONTINUE
      DO 73 N=1,3
      WAN(N)=999.9
      IF(KW(N).GT.0) WAN(N)=SQRT(WTOT(N)/KW(N))
      BAN(N)=999.9
      IF(KB(N).GT.0) BAN(N)=BTOT(N)/KB(N)
      TAN(N)=999.9
      IF(KT(N).GT.0) TAN(N)=TTOT(N)/KT(N)
      DAN(N)=999.9
      IF(KD(N).GT.0) DAN(N)=DTOT(N)/KD(N)
      IPW(N)=IPW(N)+KW(N)
      IPT(N)=IPT(N)+KT(N)
      IPD(N)=IPD(N)+KD(N)
      IPB(N)=IPB(N)+KB(N)
      PW(N)=PW(N)+WTOT(N)
      PT(N)=PT(N)+TTOT(N)
      PD(N)=PD(N)+DTOT(N)
      PB(N)=PB(N)+BTOT(N)
   73 CONTINUE
C
      PRINT 203
      PRINT 202, JY,YY(13),
     1 ((WAN(N),TWN(N),TWX(N),KW(N)),N=1,3),
     2 ((TAN(N),TTN(N),TTX(N),KT(N)),N=1,3),
     3 ((DAN(N),TDN(N),TDX(N),KD(N)),N=1,3),
     4 ((BAN(N),TBN(N),TBX(N),KB(N)),N=1,3)
      PRINT 203
  203 FORMAT('0')
C
      DO 76 N=1,3
      IF(TTX(N).GT.PTX(N)) PTX(N)=TTX(N)
      IF(TDX(N).GT.PDX(N)) PDX(N)=TDX(N)
      IF(TWX(N).GT.PWX(N)) PWX(N)=TWX(N)
      IF(TBX(N).GT.PBX(N)) PBX(N)=TBX(N)
      IF(TTN(N).LT.PTN(N)) PTN(N)=TTN(N)
      IF(TDN(N).LT.PDN(N)) PDN(N)=TDN(N)
      IF(TWN(N).LT.PWN(N)) PWN(N)=TWN(N)
      IF(TBN(N).LT.PBN(N)) PBN(N)=TBN(N)
   76 CONTINUE
      CALL SET2
      DO 77 N=1,3
      WAN(N)=0.
      BAN(N)=0.
      TAN(N)=0.
   77 DAN(N)=0.
      ICHK=9
      JY=IY
      IF(KK.EQ.1) GO TO 999
      IANN=1
C
  80  CONTINUE
C
      CALL SET1
      IF(IANN.EQ.0) GO TO 79
      IANN=0
      DO 78 N=1,3
      KT(N)=0
      KD(N)=0
      KW(N)=0
      KB(N)=0
      WTOT(N)=0.
      BTOT(N)=0.
      TTOT(N)=0.
   78 DTOT(N)=0.
   79 CONTINUE
C
      GO TO 23
C
 998  KK=1
      GO TO 50
  999 PRINT 204
      PRINT 25, TODAY
      DO 90 N=1,3
      WAP(N)=999.9
      IF(IPW(N).GT.0) WAP(N)=SQRT(PW(N)/IPW(N))
      BAP(N)=999.9
      IF(IPB(N).GT.0) BAP(N)=PB(N)/IPB(N)
      TAP(N)=999.9
      IF(IPT(N).GT.0) TAP(N)=PT(N)/IPT(N)
      DAP(N)=999.9
      IF(IPD(N).GT.0) DAP(N)=PD(N)/IPD(N)
   90 CONTINUE
      PRINT 205, TITLE,(H(I),I=1,3),YY(LM1),LD1,LY1,YY(LM2),LD2,LY2,
     1 ((WAP(N),PWN(N),PWX(N),IPW(N)),N=1,3),
     2 ((TAP(N),PTN(N),PTX(N),IPT(N)),N=1,3),
     3 ((DAP(N),PDN(N),PDX(N),IPD(N)),N=1,3),
     4 ((BAP(N),PBN(N),PBX(N),IPB(N)),N=1,3)
  205 FORMAT('0',18A4/'0',T40,3(6X,F5.1,' METERS',10X)/' ',
     1 A8,I3,', 19',I2,T35,3(5X,23('='))/' ',T12,'TO',
     2 T35,3(5X,'  AVG   MIN   MAX   HRS')/' ',A8,I3,', 19',I2,
     3 T36,3(4X,4('===== ')),/'0',
     4 T17,'WIND SPEED  (M/S)',T35,3(5X,3(F5.1,1X),I5),/' ',
     5 T17,'TEMPERATURE  (C)',T35,3(5X,3(F5.1,1X),I5),/' ',
     6 T17,'DEW POINT    (C)',T35,3(5X,3(F5.1,1X),I5),/' ',
     7 T17,'WET BULB     (C)',T35,3(5X,3(F5.1,1X),I5))
      PRINT 204
```

```
        STOP
        END
        SUBROUTINE BLNK
C...CONVERT BLANK DATA FIELDS TO 9999.9
        COMMON/DATA1/ T(3),D(3),W(3),TX(3),DX(3),TN(3),DN(3),C(9)
        DATA BK/'    '/,Z/9999.9/
C
        N=-3
        DO 10 I=1,3
        N=N+3
        IF(C(N+1).EQ.BK) W(I)=Z
        IF(C(N+2).EQ.BK) T(I)=Z
        IF(C(N+3).EQ.BK) D(I)=Z
    10  CONTINUE
        RETURN
        END
        SUBROUTINE JDAT(IY,JD,IM,ID)
C
C    THIS SUBROUTINE CONVERTS JULIAN DAY TO MONTH AND DAY
C
        DIMENSION MM(12,2)
        DATA MM/0,31,59,90,120,151,181,212,243,273,304,334,
       *          0,31,60,91,121,152,182,213,244,274,305,335/
C
        YR=IY*0.25
        IYR=YR
        S=YR-IYR
        L=1
        IF(S.EQ.0.) L=2
C
        DO 10 I=2,12
        IF(JD.LE.MM(I,L)) GO TO 15
    10  CONTINUE
        I=13
    15  ID=JD-MM(I-1,L)
        IM=I-1
        RETURN
        END
        SUBROUTINE MAXMIN
C
C.....THIS SUBROUTINE CHECKS FOR MAXIMUM & MINIMUM VALUES
C
        COMMON/DATA1/ T(3),D(3),W(3),TX(3),DX(3),TN(3),DN(3),C(9)
        COMMON/DATA2/ TT(3),TWETB(3),TW(3),ITW(3),IWETB(3),ITT(3),
       * DD(3),IDD(3),WX(3),BX(3),WN(3),BN(3),WBULB(3)
C
        DO 50 N=1,3
        IF(D(N).LT.-99.9 .OR. D(N).GT.99.9)  GO TO 25
        IF(D(N) .GT. DX(N))  DX(N)=D(N)
        IF(D(N) .LT. DN(N))  DN(N)=D(N)
   25   CONTINUE
        IF(T(N).LT.-99.9 .OR. T(N).GT.99.9) GO TO 35
        IF(T(N) .GT. TX(N)) TX(N)=T(N)
        IF(T(N) .LT. TN(N)) TN(N)=T(N)
    35  CONTINUE
        IF(W(N).LT.0. .OR. W(N).GT.99.9) GO TO 45
        IF(W(N).GT.WX(N)) WX(N)=W(N)
        IF(W(N).LT.WN(N)) WN(N)=W(N)
    45  CONTINUE
        IF(WBULB(N).EQ.99.9) GO TO 50
```

```
      IF(WBULB(N).GT.BX(N)) BX(N)=WBULB(N)
      IF(WBULB(N).LT.BN(N)) BN(N)=WBULB(N)
   50 CONTINUE
      RETURN
      END
      SUBROUTINE PSY(DB,DP,PB,WB,PV,W,H,V,RH)
C     THIS ROUTINE CALCULATES WET BULB TEMPERATURE (WB), HUMIDITY
C        RATIO (W), ENTHALPY (H), VOLUME (V), VAPOR PRESSURE (PV),
C        AND RELATIVE HUMIDITY (RH), WHEN DRY BULB TEMPERATURE (DB),
C        DEW POINT TEMPERATURE (DP), AND BAROMETRIC PRESSURE (PB),
C        ARE GIVEN
C      UNITS: DB, WB, DP = DEGREES F
C             PV, PB = INCHES MERCURY
C             W = LB OF WATER VAPOR PER LB OF DRY AIR
C             H = BTU'S PER LB OF DRY AIR
C             V = CUBIC FEET PER LB OF DRY AIR
C             RH = FRACTION (NOT PERCENT)
C
      IF (DP.GT.DB) DP=DB
      PV=PVSF(DP)
      PVS=PVSF(DB)
      RH=PV/PVS
      W=0.622*PV/(PB-PV)
      V=0.754*(DB+459.7)*(1.0+7000.0*W/4360.0)/PB
      H=0.24*DB+(1061.0+0.444*DB)*W
      IF (H.GT.0.0) GO TO 100
      WB=DP
      RETURN
  100 WB=WBF(H,PB)
      RETURN
      END
      FUNCTION PVSF(X)
C   CALCULATE VAPOR PRESSURE OF WATER (INCHES OF MERCURY) AS A
C   FUNCTION OF TEMPERATURE (DEGREES F)
      DIMENSION A(6),B(4),P(4)
      DATA A/-7.90298,5.02808,-1.3816E-7,11.344,8.1328E-3,-3.49149/
      DATA B/-9.09718,-3.56654,0.876793,0.0060273/
      T=(X+459.688)/1.8
      IF (T.LT.273.16) GO TO 100
      Z=373.16/T
      P(1)=A(1)*(Z-1.0)
      P(2)=A(2)*ALOG10(Z)
      Z1=A(4)*(1.0-1.0/Z)
      P(3)=A(3)*(10.0**Z1-1.0)
      Z1=A(6)*(Z-1.0)
      P(4)=A(5)*(10.0**Z1-1.0)
      GO TO 105
  100 Z=273.16/T
      P(1)=B(1)*(Z-1.0)
      P(2)=B(2)*ALOG10(Z)
      P(3)=B(3)*(1.0-1.0/Z)
      P(4)=ALOG10(B(4))
  105 SUM=0.0
      DO 110 I=1,4
  110 SUM=SUM+P(I)
      PVSF=29.921*10.0**SUM
      RETURN
      END
      SUBROUTINE SET1
C...INITIALIZE DATA
```

```
      COMMON/DATA1/ T(3),D(3),W(3),TX(3),DX(3),TN(3),DN(3),C(9)
      COMMON/DATA2/ TT(3),TWETB(3),TW(3),ITW(3),IWETB(3),ITT(3),
     * DD(3),IDD(3),WX(3),BX(3),WN(3),BN(3),WBULB(3)
C
      DO 10 I=1,3
      DD(I)=0.
      TT(I)=0.
      TWETB(I)=0.
      TW(I)=0.
      IDD(I)=0
      ITW(I)=0
      IWETB(I)=0
      ITT(I)=0
      WX(I)=-99.9
      BX(I)=-99.9
      WN(I)=99.9
      BN(I)=99.9
      DX(I)=-99.9
      TX(I)=-99.9
      TN(I)=99.9
   10 DN(I)=99.9
C
      RETURN
      END
      SUBROUTINE SET2
C...INITIALIZE DATA
      COMMON/DATA3/ TTX(3),TDX(3),TTN(3),TDN(3),
     * TWX(3),TBX(3),TWN(3),TBN(3)
C
      DO 10 I=1,3
      TTX(I)=-99.9
      TDX(I)=-99.9
      TWX(I)=-99.9
      TBX(I)=-99.9
      TWN(I)=99.9
      TBN(I)=99.9
      TTN(I)=99.9
   10 TDN(I)=99.9
C
      RETURN
      END
      FUNCTION WBF(H,PB)
C     THIS ROUTINE APPROXIMATES THE WET BULB TEMPERATURE FROM
C          ENTHALPY H, AND BAROMETRIC PRESSURE PB
      WB(A,B,C,D,Y)=A+(B+(C+D*Y)*Y)*Y
      W(PV,PB)=0.622*PV/(PB-PV)
      X(WB12,W12)=0.24*WB12+(1061.0+0.444*WB12)*W12
      IF (H.LE.0.0) GO TO 105
      Y=ALOG(H)
      IF (H.GT.11.758) GO TO 100
      WBF=WB(0.6041,3.4841,1.3601,0.97307,Y)
      RETURN
  100 WBF=WB(30.9185,-39.682,20.5841,-1.758,Y)
      RETURN
  105 WB1=150.0
      PV1=PVSF(WB1)
      W1=W(PV1,PB)
      X1=X(WB1,W1)
      Y1=H-X1
  110 WB2=WB1-1.0
```

```
      PV2=PVSF(WB2)
      W2=W(PV2,PB)
      X2=X(WB2,W2)
      Y2=H-X2
      IF (Y1*Y2) 130,120,115
  115 WB1=WB2
      Y1=Y2
      GO TO 110
  120 IF (Y1.NE.0.0) GO TO 125
      WBF=WB1
      RETURN
  125 WBF=WB2
      RETURN
  130 Z=ABS(Y1/Y2)
      WBF=(WB2*Z+WB1)/(1.0+Z)
      RETURN
      END
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The Nuclear Regulatory Commission (NRC) receives hour-by-hour meteorological data on magnetic tape in a format specified in Regulatory Guide 1.70, Rev. 2, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants" (September 1975). The purpose of this report was to document the computer programs that are used by the NRC meteorology staff to examine, assess and utilize these hourly values of meteorological data. A description of each of the programs is given along with the input requirements, discussion of output, subroutine flow chart, a description of each subroutine, sample output and a program listing.

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